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THE ENO FOUNDATION FOR HIGHWAY TRAFFIC CONTROL
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Who Is Responsible?

WE HAVE more cars than the remainder of the world. Our highways are unrivaled. We are a nation of drivers.

Is there any reason that our driving record should not be one of which we should be proud?

In an effort to make it so, there should be reciprocal contribution by the driver and those in authority who regulate his driving habits.

The driver attitude on the highways is not the best indication of American public courtesy. The psychology of this form of public contact is difficult to explain.

All the discussion, all that has been written, the repetition and the many statistics have been well intended efforts by seriously interested and well informed people to convince everyone of the seriousness of the traffic problem and the urgency of reasonably corrective measures.

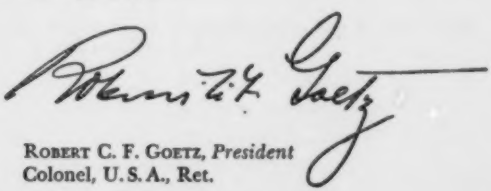
There may be other national problems that are more serious, but I cannot think of one that is more needlessly so.

Primarily, responsibility begins with the Driver. Without the mental and physical ability to accept such responsibility, he should not be authorized to drive. The power to grant such authority lies with the states. They should be encouraged to take some concerted action toward making the terms of such authorization meaningful, uniform and effective, and they should be implacable in their efforts to do so.

To drive is frequently a necessity, often a pleasure and always a privilege. To be unwilling to accept the responsibility, applicable to all, should be to deprive oneself of the privilege.

Uniform, nationwide measures will raise the pride and morale of all drivers and will not arouse the consternation of any driver who wishes to be accountable for his actions.

It is difficult to understand some of the extreme measures, both state and federal, to protect one citizen from trespass by another when one considers the consequences of the dissimilarity and the inefficacy of the laws of the highways.



ROBERT C. F. GOETZ, *President*
Colonel, U.S.A., Ret.

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Automotive Transport Paces America's Progress

PAUL G. HOFFMAN

Paul G. Hoffman is president of the Studebaker Corporation. He started with Studebaker as a salesman in 1911 and had become manager of the Los Angeles branch when World War I began in 1917. After war service, he was a Studebaker distributor for six years. He became vice president of the corporation in 1925, president in 1935. He is Chairman of the Committee for Economic Development and of the Automotive Safety Foundation. He is a director of Encyclopedia Britannica, Inc. and author of "Seven Roads to Safety." At President Truman's Highway Safety Conference Mr. Hoffman was Chairman of the Committee on Organized Public Support.

THE AUTOMOBILE, it has been said, is America's symbol of plenty. This does not necessarily mean something pat and superficial, like two cars in every garage. Its implications go even deeper than the admittedly vast contribution which automotive transportation has already made to the national welfare in terms of employment, wages and standards of living. The real meaning centers on the fact that the motor vehicle, together with the roadway it uses, has become a basic condition of our *future* progress. The United States must have an expanding highway transportation if we are to maintain an expanding economy.

Fortunately, public officials and the American people in general are becoming increasingly aware of this economic fact. The urgency of rehabilitating and improving our highway transportation system, almost completely neglected during four years of conflict, is everywhere recognized and in more than one state is being assigned top priority among the many challenging problems of the postwar era.

Thus in New York we hear Governor Dewey declare, in initiating a long-range program to restore some 13,000 miles of deteriorated roads: "Unless the highways are kept in proper shape the economy of the state will shrivel, with millions out of work. The highways are the lifeblood supplying food, jobs, industry, and recreation and health for 14 million people in this state."

And from clear across the continent, in California, comes a ringing assertion of similar import. The state legislature, called by Governor Warren into special session to deal with the critical highway transportation problem, is told by Senator Collier's Fact-Finding Committee on Roads, Streets and Bridges: "Our agricultural, industrial and social structure bears the indelible imprint of the motor vehicle. The efficiency of modern life, whether in business or recreation, is measured in terms of how long it takes to move from place to place; how much it costs in dollars and cents; and how much it costs in life, limb and personal exasperation.

"We could not alter these facts in the foreseeable future even if we wished to do so. But we can face up to the fact that, tested by any reasonable standards of efficiency, convenience and safety, our present highway plant is grossly deficient. It produces congestion, waste and annoyance, where an efficient system would supply freedom of movement, economy and personal convenience. It kills and maims people at seemingly insatiable rates, in the face of a demonstrated fact that engineering and enforcement can rid highway use of its major hazards."

Other state legislatures are similarly concerned with this pressing problem. It was a major theme of the Governors' Conferences held to date in 22 states to follow up on the recommendations of the President's Highway Safety Conference.

According to Public Roads Commissioner Thomas H. MacDonald, recent inspection of 187,557 miles of Federal Aid highways showed 27,218 miles, or 14.5 per cent, in need of reconstruction. If, as may be reasonably assumed, this ratio holds on all of the 547,000 miles of highway maintained by the states, some 65,000 miles are now either obsolescent or in disrepair and unsafe. The Commissioner also points out that there are approximately 14,000 miles of two-lane main travel routes in the states which should be changed to four-lane design because their traffic volumes far exceed the 3,000-vehicle-per-day capacity, on an annual average, which they can safely accommodate.

On the basis of the planning surveys which have been conducted by the states in cooperation with the Public Roads Administration, the American Association of State Highway Officials estimates the

total cost of necessary improvements on state highway networks throughout the nation at approximately 11 billion dollars.

Considering that the highway transportation system is currently the cause of such widespread concern and the object of such huge potential expenditures, it is worthwhile to evaluate what it represents to the country in point of economic advantages and service. During the past 25 years we have invested over 42 billion dollars in roads and spent 55 billion dollars or more on motor vehicles. What have been the relative returns in economic, social and cultural benefits?

Just as in a very real sense the story of modern highway transportation is the biography of the automobile, so in like manner does the development of automotive power closely reflect the development of America into the greatest industrial nation on earth.

Industry is the creator of real wealth, and automotive transportation has opened up vast new areas of industrial and commercial enterprise. The motor vehicle has immeasurably facilitated the movement of foodstuffs and textile raw materials from the fields, coal and ores from the mines, and timber from the forests, through the various stages of manufacture and distribution to the ultimate consumer. Fast, personalized transportation has been made available to tens of millions of our citizens, who in six out of ten trips use their cars for business purposes or for travel to and from work.

It is ironical to recall that when the automobile industry began half a century ago, dire forecasts were made that it would deprive hundreds of men of their means of livelihood. Instead, hundreds of thousands of jobs sprang up where only scores existed before. New employment opportunities were created in every state, not only in automobile factories but in steel mills, mines, oil fields and refineries, in automotive service and sales, highway transportation, road-building and maintenance, and on the farms. Directly or indirectly, the industry now provides steady and remunerative work to 7 million persons in the United States.

The industry has tremendously boosted the volume of business in other fields than its own. It is the No. 1 consumer of such products as nickel, lead, gasoline, rubber, petroleum and steel. It is a heavy purchaser of agricultural products, and in a single year uses as much

as 35 million dollars' worth of items like cotton, wool, mohair, hides, corn, wheat, turpentine, flaxseed, sugar-cane, tung oil, soybeans and beeswax, to list but a few. Curiously enough the industry is also one of the biggest customers of the railroads, and in a typical year the automotive freight moving over the rails to and from motor-vehicle plants totals over 3,500,000 carloads.

Beyond the mere fact of pioneering in mass production, the automotive industry saw in it immense possibilities for enriching human life. Assembly line methods and specialization of tasks meant more men working at machines, low unit costs, low manufacturing overhead, high wages, rising living standards and greater purchasing power for the people. This history-making new production technique has gained general acceptance and has become the keystone of the nation's business and industrial structure.

As the motor vehicle began to revolutionize the movement of people and merchandise, our highways became the principal arteries of transportation, serving every community in the land. Indeed, there are over 54,000 communities in the nation today which are served solely by motor vehicle routes. From approximately 387,000 miles of surfaced rural roads in 1921, the system has expanded prodigiously until now we have 1,430,000 miles. Not only do the highways offer a swift, flexible and complete service in themselves, but they have proved indispensable in supplementing the services of rail, water and air facilities.

By providing easy accessibility, the motor roads have stimulated the phenomenal growth of cities. By the same token, they have promoted the expansion of surburban development and the establishment of mills and factories in rural sections. Market areas have been tremendously widened, thereby permitting larger and cheaper merchandising units. Highway transportation has, in effect, put the smallest town and the remotest hamlet right on Main Street, enabling country folk no less than their city cousins to meet their economic and educational needs as well as their recreational and religious interests and responsibilities.

In terms of passengers carried, miles traveled and dollars spent, highway transportation is now by long odds the most important method of passenger transportation. The highways also hold a com-

manding lead in the short-run local movement of traffic, both passenger and freight.

Before the war, highway transport, including private cars, buses and taxis, was handling about 75 per cent of all passenger movement in cities and suburbs. This high percentage is doubtless being maintained, as indicated by the fact that in 1946, with 2 million fewer car registrations, gasoline consumption increased 4 per cent above the amount used in the peak prewar year. Furthermore, bus transportation has almost doubled, with number of total revenue passengers carried on local and intercity routes soaring from 4,924,000,000 in 1941 to 9,742,000,000 in 1945.

In cities, trucks haul practically all goods moved in local pickup and wholesale and retail delivery. An average of 50 billion ton-miles of inter-city freight a year is also moved by commercial truck, which represents considerable proportion of all relatively small consignments and valuable high-grade materials transported.

Two out of every three families in the United States own a car. For every seven families there is one truck at work, transporting food, clothing, building materials and other products contributing to comfort and well-being. Of some 30 million passenger cars in use today, 4 million are on farms.

The first movement of substantially every ton of agricultural production is over the highways, and large percentages of these food products continue direct to the market and to the individual consumers by rubber-borne transport. In 1945 the estimated tonnage of 28 leading products (grains, dairy products, livestock, fruits and vegetables) transported off the farms to consuming centers, markets and shipping points totaled nearly 178 million tons. This was an increase of 47,747,000 tons, or 36.7 per cent, over the five-year average of the years 1936 through 1940.

Nowadays over 4 million children are transported daily to and from school by bus and passenger car. The motor vehicle has to a large extent eliminated the inefficient "little red schoolhouse," and rural education is making remarkable strides as more and more young people are enabled to travel to up-to-date consolidated schools.

Even in isolated communities the automobile quickly brings the doctor to the door, while the facilities of modern hospitals are usually

within reasonable access by motor trip over all-weather roads. Likewise, the mail of almost 30 million people in the United States reaches them by Rural Free Delivery over the highways.

The importance to the nation of mobility by highway is even more graphically illustrated by consumer expenditures for transportation. For instance, in 1940 when consumers spent 7.9 billion dollars for transportation, 77 per cent of it, or 6.1 billion dollars, went for conveyance by private automobile. Actually consumers were spending 86 cents out of every transportation dollar for highway transportation.

Two decades ago the average American traveled only about 450 miles per year beyond the limits of his home town. Now his annual travel averages around 2,400 miles. This sixfold increase in individual travel largely accounts for the fact that tourists are "seeing America first." The national parks, monuments and recreational areas alone are attracting some 21 million persons annually.

Above all, the influence of the automobile has made itself felt most saliently in removing sectional barriers, in helping to destroy the once seemingly insurmountable obstacles to national unity. Economical and dependable highway transport has welded together all segments of the people as never before, while at the same time serving as a powerful democractic force to banish distinctions of background, station and occupation.

But as has been previously indicated, this gigantic highway plant of ours, productive of such inestimable benefits to the commonweal, has developed serious deficiencies. The amazing extensiveness of these roads in itself manifests a fundamental weakness. For in the main they were built under sustained pressure to provide the largest possible mileage in order to meet the demands of a traffic stream that was swelling at the rate of over a million more motor vehicles a year. Today much of this highway mileage carries a volume of transportation far exceeding what it was designed and constructed to serve.

Grim evidence of these highway inadequacies is the rising trend of accidents and congestion. Accidents are the by-product of inefficiency, exacting an unnecessary and intolerable toll of life and property. So far as the vehicle itself is concerned, the automotive

industry has been unceasing in the past in its efforts to insure maximum reliability and simplify the mechanics of driving to the highest possible degree. The industry will continue to build the safest vehicle that human ingenuity can engineer.

The other components of highway transportation are the driver and the road. As for the driver, it has been amply demonstrated over a period of many years that vigorous and intelligent enforcement and educational measures result in material reduction of accidents. We have recently had two very striking examples of this.

During the first few months of 1946, with wartime travel restrictions lifted, motor-vehicle deaths increased so alarmingly that it seemed inevitable that the 1941 record toll of 40,000 deaths would be equalled. The President's Highway Safety Conference, which was held in May, not only jolted the nation into a sudden reawakening to the traffic accident problem, but initiated a whole series of intensified safety activities. The result was that though motor vehicle mileage exceeded the all-time high of 333 billion miles in 1941, the year's total of traffic deaths was held down to 33,500—a saving of 6,500 lives.

Metropolitan Los Angeles experienced one of its blackest holidays last Christmas, when traffic accidents killed no less than 28 persons. To forestall a repetition of this carnage during the New Year's festivities, county and municipal officials and civic groups quickly organized a dynamic campaign of prevention, drastically tightening up on enforcement and utilizing the press and radio to the fullest in an educational appeal to the public. Though of brief duration, the campaign produced results. Only two motor vehicle deaths were recorded over New Year's.

Another substantial area of safety falls within the province of the men who design, build and operate highways. Obviously, no highway can be made completely accident-proof. But existing roads can be made a great deal safer through special engineering treatment of hazardous locations. New highways can be constructed to modern standards, embodying a large measure of "built-in" safety. Since the primary objective of modern highway transportation is to provide flexible rapid movement, the sensible course is to better the highways, not to make poorer vehicles.

There is no doubt, from the standpoint of efficiency, that the modern expressway holds the best promise for the transportation system of the future. These limited ways are reserved exclusively to vehicular traffic, provide no direct access to abutting property and hence eliminate parking or stopping except in case of emergency. Grade separations eliminate cross-traffic. Opposing streams of traffic are separated by dividers, with acceleration and deceleration lanes for all entrances and exits.

The safety record of several expressways in California, Connecticut, New Jersey and New York proves the effectiveness of design principles of this class of road. Reductions of accidents by 80 per cent and even more have been achieved. During the first 13 months of operation of the Merritt Parkway in Connecticut, not a single fatality occurred in a million miles of vehicular traffic.

At present there are less than 2,000 miles of modern divided highway in the country. It is expected, however, that a substantial part of the National System of Interstate Highways, which was authorized by the Federal Aid Highway Act of 1944, will eventually be built up to expressway standards. The 40,000 miles of this system will run through all main population centers, and by tapping the concentrated traffic which clogs metropolitan areas, will also help to relieve congestion. For within recent years it is the city where the traffic problem has reached the peak of severity. It is there that approximately half of all motor vehicle fatalities occur. It is there that desperately snarled arterial networks not only handicap convenient and economical transportation, but are strangling the very life of our commercial and industrial centers.

Congestion is due to a number of causes, but chiefly to the fact that most street systems are largely outmoded. At the time they were laid out, there was no such thing as a master land-use plan to guide in the location of public ways and terminals. The thoroughfares were never designed to meet the needs of modern traffic. Add to this the prevalent misuse of streets for private car parking and commercial shipping purposes, and the total represents a pattern of costly confusion and near paralysis.

For traffic congestion is extravagantly expensive to all concerned. It must be paid for in untold property losses, the spreading of busi-

ness blight in the central areas, the curtailment of essential tax revenues of municipalities, higher vehicular operating costs, delays and innumerable other penalties and inconveniences.

It is estimated that the national economic loss from congestion is at least as great as that incurred through traffic accidents, which now runs upwards of 1.5 billion dollars a year. The Regional Plan Association of New York estimated that the traffic tribulations of metropolitan New York involve a loss of a million dollars per day. Detroit figures its congestion costs at least 10 million dollars a year. St. Louis pays $125,000 a day for congestion and traffic accidents.

A study in Pittsburgh indicates that it costs 2.3 cents for each minute of delay to the average truck on the city streets; and that a saving of 10 per cent in time for each of the 10,000 trucks entering the downtown district during the day would amount to $4,140,000 annually. Boston is said to experience a loss of 40 million dollars' worth of trucking business each year because of congested thoroughfares.

While the average speed of traffic in American cities during the off-peak periods has been found to be approximately 17.38 miles per hour, this drops to as low as three miles per hour in the congested central districts. Traffic tests conducted in 1939 by Professor A. J. Bone of the Massachusetts Institute of Technology indicated that stops and other interruptions cause an increase of about 50 per cent in gasoline consumption over the amount required where no traffic interference exists. Investigations by Iowa State College disclosed that a single stop at the speed of 35 miles per hour wears away as much rubber as a mile of travel. Congestion also penalizes the motorist with proportionate increases in cost of oil and wear on brakes and other equipment.

The automotive industry has long been aware of the wastefulness of congestion, its destruction of freedom of movement, its restrictions on accessibility and the consequent depreciation of business and realty values. More than a decade ago leaders of the industry decided that the highway traffic problem deserved the same kind of scientific approach that has been applied to the solution of other major social and economic problems. It was my privilege to be associated with the late A. R. Erskine in the founding of the Bureau

for Street Traffic Research at Harvard University in 1925. Subsequently, support of the Bureau, now located at Yale, was undertaken by the automotive industry as a whole, through the Automotive Safety Foundation.

The Yale Bureau of Highway Traffic has given specialized training in traffic engineering to scores of graduate engineers, who now are serving in important administrative and consultative positions throughout the country. These men are continually demonstrating that the techniques of traffic engineering can be a tremendous force in attacking the twin problems of congestion and accidents. They have proved conclusively that despite antiquated street patterns, engineering techniques, properly integrated with other phases of traffic work, lead to safer and more efficient highway operations.

A Governor's Message on Highways

EARL WARREN

Earl Warren has been Governor of California since 1943. He served as chairman of the board of managers of the State Bureau of Criminal Identification and Investigation, received the United States Flag Association Award for Law Enforcement in 1934 and is a member of the Peace Officers' Association of California and of the International Association of Chiefs of Police. He practiced law in Oakland, Cal., from 1914 to 1938 and served as Attorney-General of California from 1939 to 1943. The following message, delivered before a joint special session of the California Legislature this year, is reprinted in the Traffic Quarterly by Governor Warren's special permission.

I HAVE called you into extraordinary session today for the purpose of considering measures to bring our highways up to date and to make their use safe for our people. Thousands of lives are being lost—thousands of people are being injured—and the development of our State is being retarded because we are trying to take care of the automotive transportation needs of nine million people on an outgrown highway system.

There was a time when California had the outstanding highways in the Union, but they have failed to keep abreast of population growth and transportation demands. Their inadequacy today is apparent to anyone—and in tragic terms.

Fatality and injury rates on our highways have been mounting year by year. In total numbers per state, they are the most numerous in the Nation. In per capita terms, only three small states—Wyoming, New Mexico and Nevada—have records worse than ours. We do not yet have the final figures, but at least 3,800 of our people met violent death on California streets and highways in the year just ended, and approximately 80,000 were injured.

HERE ARE THE FIGURES

In other words, traffic accidents killed 41 and injured 851 of every 100,000 persons in our State in 1946. Elsewhere, deaths from this

cause have been held to a ratio as low as eight per 100,000, and the national average is 26. The total number of such deaths in California every year has been consistently higher than the combined total in New York and Pennsylvania, although the population of those two states is almost three times as great as ours. The chances of being killed in an automobile accident are four times as great in California as in Massachusetts, and endless other examples could be cited to show what a fearful toll of death and injury is being taken on California highways.

We all know that selfishness, recklessness and liquor contribute to the deplorable accident situation in California, but this is also true in other states. They are universal factors. They should account for a similar number of accidents among nine million people anywhere. The difference between such a number and the high total in California must be attributed to other reasons, particularly our congested obsolete highways.

During the war, we were not able to carry on our usual program of highway construction. Every available man, every piece of equipment and every ton of material that could be used for victory had to be put to work in that even higher cause. Meanwhile, our highway deficiencies were aggravated by enforced neglect—by additional strains put on them by wartime traffic—and by a population increase unprecedented even for California.

CALIFORNIA TOOK ACTION

The State Government did not, of course, shut its eyes to the situation. In 1943, you appropriated $12,000,000 for getting plans ready and for acquiring rights-of-way for a postwar highway construction program. Also, we assisted the counties financially to the extent of $1,500,000 in making their plans for new road work, and $12,000,000 for actual construction of feeder roads.

As a result of this preparedness, the State Highway Commission was able soon after the war ended to start a highway building program to the limit of available funds. Six months after V-J Day, a third of all the postwar highway construction contracts that had been let in the entire United States were in California. As of today, the commission has let contracts aggregating $80,000,000.

We were able to proceed with this large amount of work because funds had accumulated during the war, but all of these funds will be entirely committed when we end the biennium on June 30th of this year. After June 30th we shall be able to continue constructing highways only on the basis of normal, current revenues. For construction purposes there will be approximately $27,000,000 during the Ninety-ninth Fiscal Year.

Our postwar construction program, now so well underway, will not scratch the surface of our highway needs. In 1943, our Department of Public Works reported to the Legislature that in order to overcome deficiencies existing even at that time, work costing $700,000,000 would be required in addition to regular construction programs in order to provide an adequate highway system.

CHANGED CONDITIONS, NEW NEEDS

In the meantime, our population has grown tremendously. The number of automobiles has increased until we have one for every 2.5 persons in California, compared with one to 4.1 persons on the average in the United States. Our business life is keyed even more than before to highway transportation of raw materials and finished goods. We have 2,800,000 passenger automobiles, more by far than any other state in the Union. We have 300,000 trucks, and our trucks carry loads larger by 44 per cent than the national average. We operate 3,100 school buses, involving the daily safety of 100,000 youngsters, and thousands of commercial buses that carry millions of passengers daily to their work and between our cities.

New highways must be built and existing highways must be modernized to take care of our situation, but they cannot be financed by present revenues. The books are badly out of balance as between the needs and the revenues, and we are going behind more and more all the time. There is no basis whatever for rumors that our highway construction fund has excessive balances on hand. Such rumors only trifle with the lives of our people and the development of our State.

Even in preparing its budget for the coming fiscal year, our Division of Highways was compelled to defer approximately

$40,000,000 in urgently needed work. The plans were ready, and the projects had been approved by the State Highway Commission, but the necessary funds are not available.

The principal source of our highway revenues is our three-cent gasoline tax, which is now bringing in approximately $75,000,000 a year. In accordance with our statutes, one cent of the tax, now aggregating $25,000,000, is distributed to the counties of the State for their road work. The equivalent of one-half cent, or $12,500,000 is used in our cities to build and maintain their major streets as well as the state highways which go through them.

TOO LITTLE FOR NEW CONSTRUCTION

Therefore, $37,500,000 of the gasoline tax is available to the State. Other revenues, including federal aid funds, motor vehicle fees and taxes on diesel fuel, bring $20,000,000 into our State Highway Fund. During the coming fiscal year, the highway fund will finance construction and reconstruction to the extent of $27,000,000; maintenance of our highways, $12,000,000; right-of-way purchases, $6,000,000; engineering and planning, $2,600,000; administration, $2,700,000; and other items aggregating $6,800,000. But the important fact is that $27,000,000 only will be available for new construction or reconstruction of our highways.

In accordance with our statutes, all highway funds are divided in approximately equal amounts between the northern 45 counties and the southern 13 counties of the State. With $27,000,000 available for construction next year, about $13,500,000 thus will be used in each group of counties for this purpose. It is obviously insufficient. There are cases in which $13,500,000 could be wisely spent in one county alone and still fall far short of providing adequate highways.

The inability of present revenues to meet the situation is even more apparent when we realize that 5,000 of our 13,886 miles of highways are two-lane roads less than 20 feet wide. We also have 360 miles of three-lane highways, and everyone knows that two-lane roads are bottlenecks and three-lane roads are death traps. We are desperately in need of at least 2,500 miles of divided highways to

protect lives and eliminate the congestion that causes personal irritation and economic loss.

The need for doing something to remedy our situation was recognized when your Joint Fact-Finding Committee on Streets, Highways and Bridges was created in 1945. That committee has worked diligently for a year and a half. It was liberally financed and has made exhaustive studies of traffic conditions, highway needs and methods of financing the necessary construction. Its findings—which show the estimates of the Department of Public Works to be conservative—are before you now. Therefore, it would appear that all the facts necessary for a solution of the problem are available, and that the Legislature is in a position to act.

Everyone agrees that California needs better highways. Every community is crying out for them. When we reach the point of considering methods of financing the program, however, we find ourselves for the first time in the realm of controversy.

EVERYONE HAS A STAKE IN ROADS

It is human nature for all of us to want good highways, but it is also a trait of human nature to hope that somehow or other the other fellow will pay for them. However, I believe that the people of California realize that our highway system benefits everyone who uses it, and that all users should pay their fair share of the cost of construction and maintenance.

By the term, "their fair share," I mean that each user should pay according to the use he makes of our highways. I mean that trucks and buses should pay more than passenger cars, because they make greater demands upon the highway system. I mean that all trucks, whether operated commercially or privately, should pay comparable taxes for comparable use of our highways.

Practically every state in the Union has found that the fuel tax paid by heavy vehicles, as compared with the fuel tax paid by small passenger automobiles, does not represent the proportionate use that is made of the highways by these classes of vehicles. It is only fair, and it coincides with national experience, for the heavy vehicles to pay an additional tax.

SUGGESTS HIGHER GASOLINE TAX

On the other hand, I am of the opinion that even after we establish equitable rates of taxation among all users, there will not be enough money available to bring our highway system in California up to date unless we increase the present three-cent gasoline tax. We can do this without being out of line with the rest of the country. With one possible exception, no other state has a lower gasoline tax than ours.

This possible exception is Missouri, which has a two-cent state gasoline tax, but which also permits cities and counties to levy a gasoline tax. California is one of seven states which have a three-cent tax. Forty states have higher taxes, ranging from four cents to seven and one-half cents, with 20 levying a tax of four cents, nine a tax of five cents and six a tax of six cents.

I would much prefer to have California remain in the three-cent group, as I know you would, but I see no escape from the necessity for an increase. In order to have good highways, we will have to pay for them. All of us should be willing to pay in accordance with the use we make of them or the benefits they bring to us, but in the last analysis we will pay a highway bill whether we construct highways or not.

If we temporize with present conditions or delay action by failure to agree upon a distribution of cost among the different users, we will pay for our highways in lost lives and suffering. We will pay in the irritations that result from traffic congestions. We will pay in retarded commercial and agricultural activities, in higher motor vehicle operating costs and in a gradual but relentless strangulation of the development of our State.

URBAN AND RURAL DISTRICTS

The division of revenues between urban and rural districts, and between the large populous centers and the smaller communities, may also cause differences of opinion and extended argument. However, I believe that the Legislature recognizes, as I do, that the State Highway System is designed for the benefit of all our citizens and for the ultimate development of our entire State. I am sure you also recognize that all parts of California are inter-dependent, and that no high-

way system will be adequate to our needs that does not provide suitable laterals as well as main arteries, and freeways through our cities as well as farm-to-market roads.

I feel sure that the combined wisdom and the sense of fairness of the Legislature will resolve such questions in the true public interest and in accordance with the paramount objective of developing California not only for ourselves but also for the millions who will follow us.

Questions as to how, when and in what order highways are to be constructed undoubtedly will also be considered by you, and I trust that answers will be found consistent with sound planning, engineering experience and current needs as ascertained by traffic experts. Any reversion to procedures which experience in California and other states has proved to result in log-rolling or in porkbarrel legislation would of course make an orderly development of our highway system impossible.

In this connection, your committee has requested that the call of this special session include the opportunity, if found desirable, to reorganize the State Highway Commission. I have no recommendation to make to you in this regard, because I do not know exactly what your committee has in mind, but I believe that it is a matter that you should be entitled to consider. Consequently, the call has been made sufficiently broad for that purpose.

A DEPARTMENT OF TRAFFIC ENFORCEMENT

Also, it has been recommended by your Committee on Governmental Reorganization that the call include consideration of the reorganization of the State Highway Patrol. Regardless of the promptness with which you act to modernize our highways, we will have to tolerate the present system while it is being replaced. If these highways are not used properly, we shall continue to lose too many lives and injure too many people. Therefore the organization of the patrol, its powers, duties and responsibilities, its management, its training and its equipment are all matters that merit your very serious consideration.

Through the years the patrol hardly has had a fair opportunity to

render its best service because the organization was developed by trial and error. Originally the enforcement of traffic laws was in the hands of district attorneys and sheriffs. When the responsibility was first assumed by the State, the power to appoint members of the patrol was retained by the supervisors of the 58 counties. Step by step, it was merged in the Department of Motor Vehicles, but looseness of organization and constant changes of state administration and department directors have militated against its development as a law enforcement agency through the establishment of sound, long-term policies for the enforcement of our traffic laws.

I am of the opinion that if we were to have a Department of Traffic Enforcement, we could serve the cause of traffic safety better than we do at the present time. Such a department would, of course, encompass the present highway patrol. It would have the responsibility of dealing with traffic problems throughout the State and the opportunity to cooperate with city and county governments in the development of traffic safety programs. This is something from which we can obtain immediate results.

I have called this special session because in my opinion these problems should have your undivided attention, and because the statutes you will enact will go into effect much earlier then they would if enacted at your regular session. Time is the essence of our problem, and I am sure that the people of California want us to proceed along these lines.

Throughout your deliberations, I want you to feel that my personal cooperation and every facility of my office are at your disposal. Our department heads, our engineers and fiscal experts, and everyone connected with state government are anxious to help in solving the highway problems of California. As a matter of fact, our Division of Highways is ready right now with plans and specifications for two years in advance. All we need now for progress is the necessary legislation.

London's Traffic Problem

SIR ALKER TRIPP, C. B. E.

Sir H. Alker Tripp is Assistant Commissioner of Police, Scotland Yard, London, England. He is in charge of London's traffic control. A recognized authority on traffic matters, he is the author of "Road Traffic and Its Control" and of "Town Planning and Road Traffic." The following article was written on invitation for the Traffic Quarterly.

IT HAS been suggested that a short paper on the problem of London traffic would be of interest to American readers. I am only too glad to supply the paper, and I hope that it may prove of interest—conscious though I am of the vast amount of research in road problems that has already been undertaken in the U.S. and the great fund of knowledge which has been amassed. It is some years since I was in America, but I have always tried to keep myself informed of the continual progress there.

Now as to London. The roads are of course an important part of the town-planning of London as a whole, and, in our post-war town-planning, a well-designed road-plan is essential; the present road system in this island is *not* well designed; the measure of its defect is proclaimed by the fact that, in the ten years before the war, more than two million people were killed or injured on the roads of Great Britain.

In order to qualify himself for the type of planning required, the town-planner or road-planner must first of all realize what is causing these road casualties. The root cause is perfectly simple. Whereas the railways provided suitable tracks before high speeds were developed, no such provision was made for motor traffic. Speeds like those of the railway were developed on roads built merely for horse-drawn traffic.

In central London every one of the major roads was built in the horse traffic era. In addition to that, the whole road system is like a railway without sidings. How would the railways work if there were running lines only? All circulation would stop.

We must face the facts. The change from horse-drawn to motor

traffic was a revolution, and nothing less than corresponding revolution in roads and road-user will suffice. The needed revolution is still awaited. It can be brought about only by investing millions of money.

There are two main aspects of the traffic problems: Circulation and Safety. These can be taken separately.

TRAFFIC CIRCULATION

Forty years ago we thought that London traffic was dense enough, and wanted more room. But look at it now. The traffic at Hyde Park Corner has been trebled. In Trafalgar Square, Piccadilly and Holborn it has been doubled; at Hammersmith Broadway it has been trebled.

No one can put a quart into a pint pot. These London roads of ours will carry so much, and no more. We have used traffic signals, one-way workings and so on, but the fact is that the traffic is often close upon saturation point. Certain measures are imperative, for otherwise we shall either see London traffic at a standstill, or a London closed to some classes of traffic (e.g. private cars) . Two obvious things have to be done. First, we *must* have accommodation for standing vehicles. In London we want accommodation under squares, under parks, under buildings, in multi-storeyed buildings, and on open sites wherever available. The parking spaces must be at frequent intervals: the accommodation must be on the spot *where it is wanted,* not where it can most easily be provided.

Secondly, we must keep the through traffic from going through central London. This can only be done by an effective ring road. We have no such modern highways as the Riverside Drive and the East River Drive in New York; and London needs them. The inner ring which we require in London is one with a diameter of 1½ to 2 miles, with Charing Cross as the centre; but a road on ground level would not meet the case: it must be elevated or sunk, for otherwise it would not attract the through traffic. A journey from north to south of the area on existing roads now takes some 16 minutes, and a journey round a ring road on ground level (and therefore with numerous junctions) would take at least 20 minutes, and so would

obviously not attract drivers. On an elevated or sunk road the journey would take 7 minutes, and would attract all the through-traffic. The plan has been worked out, affording non-stop movement round the ring; but the cost will be great.

There are many other projects, but space forbids a detailed description.

ROAD SAFETY

When we look at the big casualty maps, one thing is very clear. The great majority of casualties are ribboned along the main traffic routes; and pedestrians represent 60 per cent of the fatalities in London.

Only when inhabitants are "exposed" to the traffic do they become road casualties. Pedestrians are not "exposed" to railway traffic because it is fenced off from them, and they from it. But pedestrians are very much exposed to road traffic in Oxford Street, London, and it has a shocking casualty record. Oxford Street is a very busy shopping street, and a traffic artery as well. If we cannot withdraw shopping crowds from a traffic artery, we must withdraw the traffic and send it elsewhere. We must, in fact, on the largest possible scale, divert the main traffic flows from the daily haunts of the populace. It can be done.

PLANNING FOR TRAFFIC

The first step towards planning is, I submit, to get rid of the nondescript road; every road must have its own definite and clear-cut character and office. Roads fall into two classes, the functions of which are not only entirely different, but are mutually antagonistic, viz. (i) roads built as traffic conduits, and (ii) local roads which are roads intended for residence, shopping, business, industry, etc.

In planning for the future, my view is that, in England, we must take account of three generic types of road and three only, viz:

a. arterial, i.e. the roads for fast motor traffic only, which are essential but are not as yet provided.

b. sub-arterial, i.e. the other main traffic conduits—now and hereafter.

c. local, or minor.

The local roads can be divided up into as many categories as the town-planner may desire (shopping, residential, etc. etc.) but generically—for traffic purposes—all such roads have the same status, viz. that of a local road. On arterials and sub-arterials, the interests of the traffic will be regarded as absolute; and all other interests must go to the wall. In the case of the local roads, on the contrary, traffic considerations must be entirely subordinated to the needs of the local frontagers and pedestrians—in other words the local populace.

When this scheme is mapped out for any area, a sub-arterial grid is created on paper. The spaces between the sub-arterials of this grid will comprise little local systems of minor roads. It is in these spaces, known as "precincts," that industry, business, shops and residences will be located, quite away from the through traffic. The local roads in each precinct must be designed—by means of obstructive layout if necessary—in such a way as to deter the through-traffic from using them.

ESSENTIAL REQUIREMENTS FOR THE FUTURE

What now is required? Let us summarize some major principles.

1. Sidings MUST be provided.

Tracks without sidings are totally inadequate. The Highway Authorities—it seems clear—are under an obligation to provide the sidings, as an essential part of the highway system.

2. A sharp and absolute line must be drawn between the traffic conduits and local roads (i.e. the roads of the neighbourhood units, where people live, shop and have their business and amusements).

There must be no overlap between the two classes of road. The overlap causes vast numbers of casualties. There must be no compromise as to this in future plans. Compromise means casualties.

3. We MUST divorce building development from traffic roads.

The divorce of building development from traffic roads can only be complete in the case of new roads. But we must do our very best on all existing traffic roads also. Any building development on traffic roads is an *evil*. The past cannot be undone, but the evil can be pre-

vented from spreading. All existing roads which will be traffic roads in the future (however humble they may be at present) should be scheduled at once and kept entirely clear (1) of further building development, and (2) of unnecessary new access. All future building development must be confined to *ad hoc* local roads.

A case in point is that of a congested shopping road, which—in ninety-nine cases out of a hundred—is a stretch of a sub-arterial. More road space is wanted. That space should not be provided—as most people seem to assume—by setting back frontages; in most cases the shopping street should be left as it is; it will be quite a decent shopping street *if the superfluous through-traffic is cleared out.* A parallel road of sub-arterial status should therefore be provided in the cheaper region of the back yards, which would drain off the whole of the through-traffic that has no business at any of those shops; and subways—suitably located—should be provided to get the shoppers safely across the new sub-arterial road. Quite likely this would be cheaper than the setting-back of frontages, and it would certainly have a good effect upon road casualties. A widening of the existing road would allow the through traffic to go faster than at present, and would thus be pretty sure to increase casualties. This brings us to a fourth principle.

4. We MUST stop the wanton exposure of pedestrians to traffic.

The pedestrians, who represent 60 per cent of the total fatalities, would not become road-casualties had they not been "exposed" to road traffic. That "exposure" therefore is a factor which needs to be attacked at every opportunity. On existing roads there is a great deal of exposure, but on new traffic roads there need be none. New roads *created to meet the needs of motor traffic,* as distinct from roads built for housing, etc. are no place for pedestrians. Pedestrians have plenty of routes already, and any new ones that they require should be kept quite away from main traffic routes. For pedestrians traffic roads are the very worst place conceivable.

Every new road will in course of time have its own casualty coefficient, and that coefficient can be kept down with certainty beforehand—if pedestrians are excluded. The traffic on such roads will run thousands of vehicles-miles without a single pedestrian casualty.

It is all gain and no loss; the casualties are not transferred to other places; they are abolished.

5. We MUST get rid of horse-and-cart mentality.

Old habits die very slowly, and we are encumbered with tradition. It is the horse-and-cart mentality that continues to expose pedestrians, quite unnecessarily, to express-speed traffic. It is horse-and-cart mentality that makes people want to build residences and shops along express-speed main roads. It is horse-and-cart mentality that, even in new construction, keeps alive the nondescript road.

The clean cut is essential. The change from the crawling horse-and-cart to the express motor car was a revolution. A corresponding revolution in roads and road user is the only hope.

I submit that the principles which I have suggested are of paramount importance. If they are faithfully respected by the town-planner and road-planner, great results are bound to accrue. I know that the application of principles will often be extremely difficult, but we must never give in. In this matter, as in so many others, "it's dogged as does it."

In this paper I do not for a moment presume to suggest what America should do, but I have tried to indicate some principles which seem to me to be of fundamental importance in London, and indeed in all Great Britain.

Speed Laws and Enforcement

WILBUR S. SMITH AND CHARLES S. LECRAW, JR.

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IN AN automobile race from Chicago to Waukegan and return fifty-one years ago, the winner averaged approximately 10 miles an hour. In 1895 this was speed. With the improvements in automotive engineering and in our highways, our conception of speed has changed. Today automotive transportation is an important factor in our social and economic life. To turn back to the speed of 1895 would be paralyzing. Our conception of speed has grown broader with the increased use of the automobile, but there has never been, in the half century from 1895 to the present day, any unanimity of thought in the regulation of speed, particularly with reference to its importance as a cause of accidents.

There has never been a practical agreement on the question of speed between road users, legislators and enforcement officials. As a result, wide variances have always existed in speed laws and speed enforcement practices.

Before World War II, trends in speeds were steadily upward. Both laws and enforcement policies were liberalized. During the war, drastic speed restrictions were imposed for conservation purposes. With the end of the war, traffic speeds again increased and attention was refocused on speed regulations. Increases in accidents since the removal of travel restrictions have served to amplify the attention given to speed control by public officials and law making bodies.

Answers to many questions are needed: To what extent, if any, must traffic speeds be restricted for safety and the public good? Without further reliable information, how, logically, can legislation be enacted? Can existing restrictions be enforced? What policies are effective and what methods are efficient in speed enforcement? Obviously, the answers to these and other questions can be derived

only from experiences of various states and cities. A study recently conducted by the Eno Foundation sought to ascertain the practices and policies of states and cities relative to some of the most significant and controversial aspects of speed enforcement.[1]

Many findings of the study are especially interesting and should be valuable to public officials in formulating and administering programs for the regulation and improvement of traffic conditions. It is not the purpose of this paper to make specific recommendations but to report objectively, in so far as can be learned, existing practices in speed regulation. Information furnished by 32 states and 448 cities forms the basis of this report. The cities included 37 per cent of those with populations of 10,000 to 25,000; forty-three per cent with populations 25,000 to 50,000; forty-five per cent with populations 50,000 to 100,000; and 74 per cent of the cities with populations of 100,000 and over; as shown in Table I.

Table I

SOURCES OF INFORMATION ON SPEED ENFORCEMENT PRACTICES

Source	*Number*	*Furnishing Information:* *Number*	*Per Cent*	*Number of States Represented in Each Population Group of Cities*
States	48	32	67	
Cities:				
10M–25M	651	240	37	44
25M–50M	210	91	43	32
50M–100M	109	49	45	22
100M and over	92	68	74	32
Total cities	1062	448		
Total Sources	1110	480	43	

SPEED LAWS

Enforcement policies are dependent on laws and official regulations for application; however, many policies are induced by inadequate

[1] A complete report on the study of Speed Enforcement Practices will soon be released by the Eno Foundation for Highway Traffic Control.

or improper laws. An analysis of speed laws is, therefore, essential to a study of speed enforcement policies and practices.

It is apparent from the information furnished by 32 states that wide variances exist in numerical speed limits. A range in state rural limits is from 35 mph to 60 mph. This great difference in limits is hard to justify. Four states have different limits for "day" and "night." Fifty-four per cent of the states have prima facie limits while the others have absolute limits. Numerical limits are further complicated by different allowances for trucks than for passenger vehicles in 34 per cent of the states. Laws regulating the minimum speeds of vehicles are in effect in 56 per cent of the states.

Cities likewise have great differences in numerical limits for business and residential districts. Those with populations from 10,000 to 25,000 range from 10 mph to 35 mph—36 per cent prima facie. Cities with populations from 25,000 to 50,000 have speed limits ranging from 8 mph to 35 mph—62 per cent prima facie. Where the size of the cities varies from 50,000 to 100,000, the range is again 8 mph to 35 mph, with 62 per cent prima facie. Cities with populations of 100,000 and over have speed limits ranging from 10 mph to 35 mph—51 per cent prima facie.

These comparisons indicate that 35 mph is the maximum limit allowed within the corporate limits of cities reporting. Many cities apply blanket limits while others have different limits for business and residential districts. Fifty-one cities have different limits for trucks and passenger cars; 10 per cent of those with populations of 10,000 to 25,000; thirteen per cent with populations 25,000 to 50,000; twelve per cent with populations of 50,000 to 100,000; and 11 per cent with populations of 100,000 and over. Minimum speed regulations are in effect in most of the large cities, but in few of the small ones. Minimum speeds as a rule are not posted, but are provided for in state codes.

Speed zoning is now widely used for adjusting numerical limits to traffic and roadway conditions as evidenced by the fact that 95 per cent of the states have speed zoning authority. The responsibility for zoning is assigned to many different agencies of state governments, as shown in Table II.

Ninety per cent of the cities with populations of 100,000 and

over, 82 per cent with populations 50,000 to 100,000, eighty-three per cent with populations from 25,000 to 50,000, and 92 per cent of the cities with populations of 10,000 to 25,000 report speed zoning authority. The agencies given the zoning authority in cities are indi-

Table II

RESPONSIBILITY FOR SPEED ZONING IN STATES

Person or Agency	*States Reporting*	*Percent*
State Highway Commissioner	12	41
State Highway Department	4	14
Public Safety Department	2	7
Public Works Department	1	3·5
Motor Vehicle Commissioner	2	7
State Police	3	10
City	2	7
State Traffic Commission	1	3·5
State and City (Jointly)	1	3·5
State (No agency named)	1	3·5
Totals	29	100

cated in Table III. Some states and cities raise or lower their numerical limits by zoning; some lower them only; others raise them. Methods of determining limits for zoning vary from "complete engineering investigations" to "opinion of police chief."

With so many different speed limits and regulations, wide variances in speed enforcement practices must be expected.

PACING SPEED VIOLATORS

To prosecute a motorist for an infraction of speed regulations, enforcement officers must determine the speed at which the accused is driving. This is usually accomplished by having the officer follow the violator a sufficient distance to ascertain his speed. Some states and cities require speeders to be "paced" specified distances before apprehension. In fact, twenty per cent of the states furnishing information, reported laws requiring speeders to be paced by officers. Only two states, however, reported laws requiring pacing for a

minimum distance: one a fourth of a mile, the other one-half mile. The other states leave the distance to the discretion of the officer.

Ordinances require pacing before arrests for speeding in 26 per cent of the cities with populations of 100,000 and over; in 51 per cent

Table III

RESPONSIBILITY FOR SPEED ZONING IN CITIES BY POPULATION GROUPS

Individual or Agency Responsible for Speed Zoning	*Per Cent of Each*			
	10,000 to 25,000	*25,000 to 50,000*	*50,000 to 100,000*	*100,000 & over*
City Council	57%	59.2%	51%	47.5%
State	18	26.3	23.2	24.6
Chief of Police	9	6.6	2.4	–
Police Department	4.3	4.0	4.6	6.5
Police Commissioner	–	1.3	2.4	1.7
Traffic Captain	–	–	4.6	1.7
Director of Public Safety	1.5	–	–	1.7
Traffic Engineer	–	–	2.4	14.6
Traffic Commission	1.4	–	2.4	–
Mayor or City Manager	1.9	–	2.4	–
City Engineer	1.4	–	–	–
City Judge	0.5	–	–	–
Traffic Engineer and Chief of Police, Jointly	0.5	–	–	–
Director of Motor Vehicles	–	–	–	1.7
"City"—no agency given	1.0	2.6	–	–
Zoning not used	3.5	–	4.6	–
Totals	100%	100%	100%	100%

of the 50,000 to 100,000 group; in 41 per cent with populations of 25,000 to 50,000; and in 48 per cent of the cities with populations from 10,000 to 25,000. In most of the ordinances, distances are not specified. Where stated, the distances speeders must be paced vary from 100 feet to one-half mile; one-eighth of a mile is the distance most commonly required in cities.

In practice, speeders are paced farther than is required by law. Some states and cities leave the pacing distance to the police involved in each case, but by administrative orders, many require minimum distances. Ranges for business, residential and rural areas

are shown for states and cities of various sizes in Table IV. Some require pacing for as far as a mile in business districts. In open or rural areas, distances of two miles are not uncommon for pacing speeders.

Police can make speeding charges in 13 per cent of the states without pacing. This practice is allowed in 25 per cent of the cities with populations of 10,000 to 25,000; in 21 per cent with populations of 25,000 to 50,000; in only 15 per cent with populations of 50,000 to 100,000; and in 21 per cent with populations of 100,000 or more.

USE OF SPEED MEASURING DEVICES

The use of meters, or other devices, in or along the roadway, to measure vehicle speeds is not common. Only one state reported the use of such devices in the enforcement of speed limits. There the practice was initiated during the war.

Cities make a greater use of mechanical and other measuring devices. Sixteen per cent with populations of 10,000 to 25,000; ten per cent with populations of 25,000 to 50,000; sixteen per cent with populations of 50,000 to 100,000; and 12 per cent with populations of 100,000 and over use measuring devices. The number of cities reporting the use of speed measuring devices is shown in Figure I.

The various types of devices and methods employed by cities to ascertain speed violations are shown in Table V. Special meters, designed especially for the job, are used by 29 of the cities which furnished information. The only state reporting use of such devices uses mirror boxes.

CRUISING VS. CONCEALED ENFORCEMENT TECHNIQUES

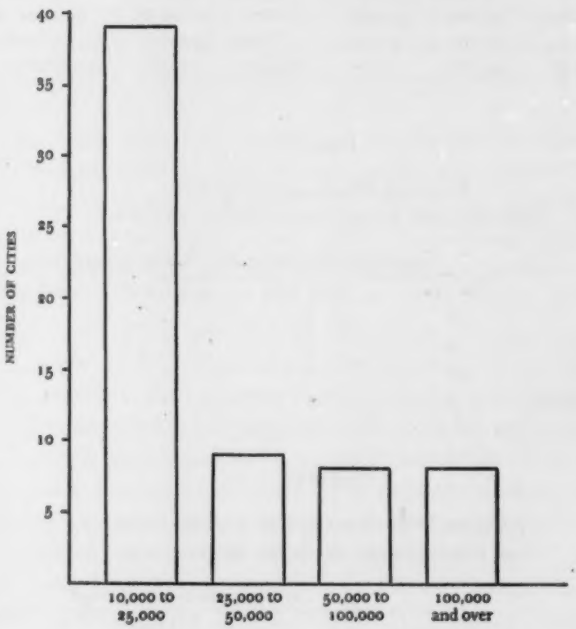
The practice of concealing officers and their vehicles from easy view of motorists, sometimes called "in-the-hole," is not common with state traffic enforcement agencies. Only four of the 32 states furnishing data indicated concealed enforcement of speed regulations. The maximum utilization was shown to be 30 per cent of the total traffic enforcement effort.

Concealed enforcement is more common for speed violations in cities than in states. Twenty-six per cent of those with populations

of 10,000 to 25,000 use such techniques to some extent; two of those cities accomplish 75 per cent of their speed apprehensions by concealed officers. In cities with populations of 25,000 to 50,000, twenty-

FIGURE 1

CITIES EMPLOYING MECHANICAL DEVICES TO ASCERTAIN SPEED VIOLATIONS



one per cent use some degree of "in-the-hole" enforcement, one using it to 95 per cent of its total speed enforcement effort. Twenty-nine per cent of cities of 50,000 to 100,000 use hidden enforcement to varying degrees, one using this method in 90 per cent of its speeding cases. Relatively, the largest cities employ concealed enforcement techniques most commonly; 50 per cent of those of 100,000 popula-

Table IV

Ranges in Distances Speeders Are Paced

	Minimum Pacing in Distances Required					
	Business District		*Residential District*		*Rural District*	
Jurisdiction	*Low*	*High*	*Low*	*High*	*Low*	*High*
States	1 block	½ mile	2 blocks	½ mile	1000 feet	2 miles
Cities:						
100,000 and over	1 block	½ mile	1 block	1 mile	2 blocks	2 miles
50,000 to 100,000	50 feet	½ mile	100 feet	10 blocks	900 feet	½ mile
25,000 to 50,000	½ block	1 mile	1 block	½ mile	1 block	2 miles
10,000 to 25,000	150 feet	1 mile	200 feet	2 miles	200 feet	2 miles

Table V

Types of Mechanical Devices Used by Cities to Ascertain Speed Violations

	Number of Cities Using Each in Population Groups			
Device	*10M–25M*	*25M–50M*	*50M–100M*	*100M and over*
Meters	18	6	1	4
Mirror Boxes	9	3	5	3
2-Way Radio	26	2	2	0
Lines and Watch	1	1	1	2

Table VI

Reasons Why Tolerances Are Allowed in Enforcement of Speed Regulations

	Per Cent of Reasons Reported				
Reason	*States*	*Cities*			
Tolerance Allowed		*10M–25M*	*25M–50M*	*50M–100M*	*100M and over*
Adjustment for Speedometer Errors	56	40	36	35	41
Create Public Good Will	25	36	39	27	39
Courts Require for Conviction	16	14	17	19	13
Numerical Limits Considered Too Low	3	10	8	19	7
Total	100%	100%	100%	100%	100%

tion and over use some concealed enforcement; 12 per cent estimate that one-half of their speeding cases are made by concealed officers.

TOLERANCES

As a rule, numerical speed limits are rarely ever enforced to the letter. For diverse reasons, enforcement officers and officials have followed the practice of allowing violation in excess of the numerical limits, where speeding was the only offense, before apprehension. In procuring information for the study, an attempt was made to ascertain the most significant reasons why these "tolerances" are allowed.

In both states and cities, the tolerances are most frequently justified in order to "adjust for speedometer errors." Fifty-six per cent of the states gave this as the reason for allowing tolerances. Cities with populations from 10,000 to 25,000 give as their reason for tolerances, "adjustment for speedometer errors" in 40 per cent of the cases; whereas 36 per cent of cities in the group 25,000 to 50,000; thirty-five per cent of those between 50,000 and 100,000; and 41 per cent of all cities 100,000 and over list as the justification for tolerances, the necessity of adjusting for speedometer errors.

The intent of creating good will in traffic enforcement work is the second most commonly reported reason for tolerances in speeding cases: it is reported in about the same ratio for the different population groups as the matter of correcting speedometer errors. The attitude of the courts toward convicting for "bare" violations has led many jurisdictions to adopt a policy of tolerances in speeding cases. In other cases, particularly in cities, the enforcement officials consider the numerical limits as too restrictive and therefore attempt through tolerances to allow more reasonable driving practices. The distribution of reasons for tolerances for cities of different populations and in states is shown in Table VI.

Most of the states reported the allowance of tolerances—only four of the 32 do not allow speeds in excess of the numerical limits before making charges. Within the various groups of cities, 19 per cent of those with populations 10,000 to 25,000; seventeen per cent of all cities in the group 25,000 to 50,000; twenty-five per cent of

the cities between 50,000 and 100,000; and 21 per cent of all cities 100,000 and over do not allow a tolerance above the posted speed before charges are made.

Wide variances in tolerance values are noted in Table VII. The most common practice is to allow a five mile per hour tolerance in

Table VII

COMMON PRACTICES IN ALLOWING TOLERANCE ABOVE POSTED LIMITS BEFORE CHARGES ARE MADE

	Per Cent of Each				
		Cities			
Tolerance	*States*	*10M–25M*	*25M–50M*	*50M–100M*	*100M and Over*
Miles per Hour					
3	–	3	5.1	9	4.1
5	54	44	47	34	61
6	–	–	1.6	–	4.1
7	–	1	–	–	1.6
8	–	1	–	3	–
10	21	27	25	20	15
15	4	5	5.1	14	1.6
25	–	–	1.6	–	–
Per Cent of Speed					
5%	–	0.5	–	–	1.6
10%	4	–	3	3	–
15%	–	–	1.6	–	–
20%	–	0.5	–	–	–
No Specified Amount, left to Officer	17	18	10	17	11
Total	100%	100%	100%	100%	100%

all speeding cases. Some states allow tolerances of 15 mph; others do not specify, but leave the amount to the individual patrolman.

In cities, tolerances from 3 mph to 25 mph were reported. The most frequent tolerances in cities are 5 mph and 10 mph, the former being slightly more predominant. As with states, a number of cities specify no specific amount; others vary the tolerance as a per cent of

the posted speed, the range being from 5 per cent to 20 per cent of the posted speed.

An attempt was made to ascertain the bases on which officers are instructed to vary their allowances where fixed tolerances are not prescribed. Very little information was obtained although several cities indicated that weather conditions, visibility, and traffic volumes were the main considerations.

VEHICLES USED FOR APPREHENDING SPEED VIOLATORS

Many different types of vehicles are used by police in traffic work. As a rule, the vehicles employed in speeding cases are the ones used in general traffic enforcement activities. Considering all types of automobiles and motorcycles under the general headings "autos" and "cycles," significant differences in practices were determined. The per cent of each type vehicle and of combinations of the two types are shown in Figure 2.

Automobiles are highly preferred in states, 64 per cent using them exclusively. No states now use motorcycles exclusively.

It is interesting to note that as the size of cities decreases the ratio of automobiles used exclusively for speed enforcement increases rapidly. Only 6 per cent of the larger cities over 100,000 employ automobiles exclusively for speed enforcement activities. In both the population groups 50,000 to 100,000 and 25,000 to 50,000 this use of automobiles to the exclusion of motorcycles is observed in 15 per cent of the cities. Of the smallest population group studied—10,000 to 25,000—forty-three per cent of the cities reported that automobiles were used exclusively for speed enforcement activities.

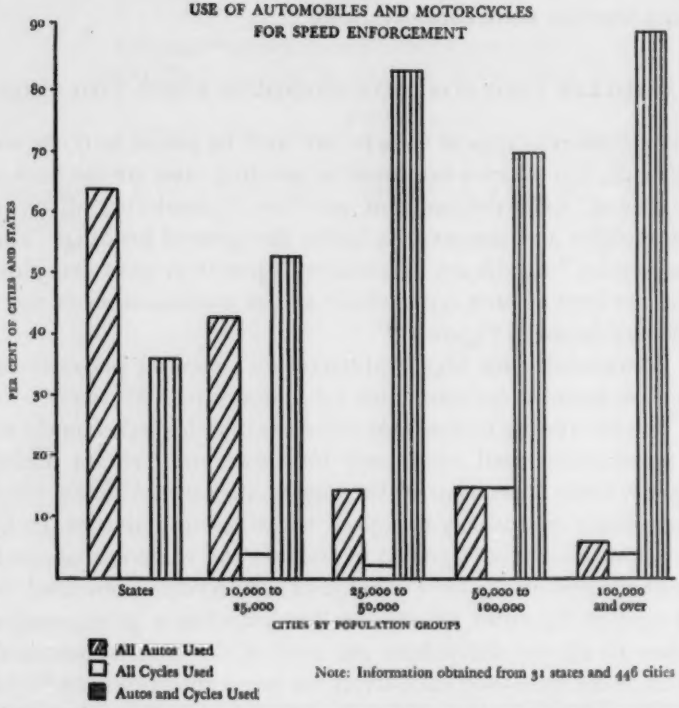
The differences in practices between the small and large cities are partially explained by the fact that police vehicles in the smaller cities are used for general police and utility activities, whereas more specific uses of equipment are advantageous in the larger cities. Acute congestion characteristics and heavier traffic volumes in larger cities often require the use of smaller and more maneuverable vehicles.

Information was obtained on the body styles of automobiles, but many officials indicated that their normal practices and desires do

not now prevail because of the acute shortage of automobiles during the war. This resulted in enforcement agencies purchasing automobiles on the basis of availability rather than desire. In state police

FIGURE 2

USE OF AUTOMOBILES AND MOTORCYCLES FOR SPEED ENFORCEMENT



organizations, sedans are heavily favored. On the average, more than 80 per cent of the vehicles used for speed enforcement are sedans. The only other body style employed with any frequency is the coupe.

Cities likewise favor the sedan. As expected, the standard two-wheel motorcycles are by far the preferred type of motorcycle for speed enforcement, though some cities attach side cars in inclement weather.

MARKING OF POLICE VEHICLES

The policies relative to the conspicuous marking of automobiles used in traffic work varied widely. Some vehicles are painted a distinctive color, making them easily identified. Some are distinguished from conventional vehicles only by a seal or special marking—usually on the door panel. Some vehicles are identified by special licenses, fender lights, and other less conspicuous means. Classifying all of the vehicles with distinctive markings, regardless of the variations, it is found that "marked" cars by far predominate in state organizations. On the average, about 82 per cent of state patrol vehicles are "marked."

In checking the practice of marking vehicles in cities, it is interesting to note that the ratio of marked to unmarked vehicles increases as the size of the cities increases. This is shown in Figure 3.

PENALTIES IN SPEEDING CASES

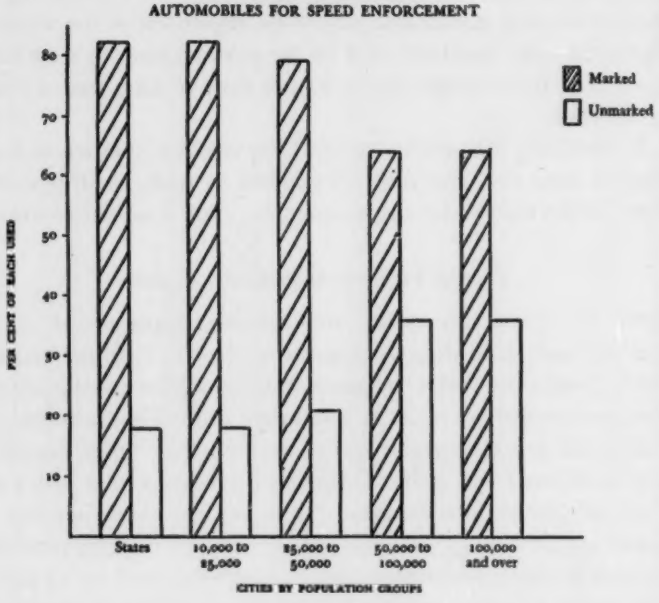
There are many interesting and varying applications of these three methods of dealing with speed violators. The most common practice prescribes that a written summons will be given to all speed violators to appear in court at a specified time. The summons is applied to all speeders regardless of residence or other conditions, where speeding is the only offense and is not combined with a more serious offense such as reckless driving or drunken driving. This blanket application of the summons is employed by 25 per cent of the cities in the population group 10,000 to 25,000; by 14 per cent in the group 25,000 to 50,000; by 28 per cent of the cities with populations 50,000 to 100,000; and by 43 per cent of all cities 100,000 and over. Only one state reported the use of this system.

Another practice commonly employed provides that the officer shall warn all speeders who are barely exceeding the posted limits and either issue a summons or arrest those clearly exceeding the limit. Some cities specify that warnings will be issued for speeds between the posted limit and the tolerance which is allowed, while many other cities do not prescribe the exact limits to be used for warning, but leave this matter to the discretion of the officer based upon conditions at the time and place the offense occurs.

Twenty-nine cities reported no fixed policy for the use of warnings, summons or arrests, but leave the decision entirely in the hands of the arresting officer. The practices of states and cities within the various population groups are shown in Table VIII.

FIGURE 3

USE OF MARKED AND UNMARKED AUTOMOBILES FOR SPEED ENFORCEMENT



Note: Information obtained from 31 states and 427 cities

USUAL FINES FOR SPEEDING

Fines generally imposed for speeding violations were reported from a minimum of $1 to a maximum of $200. The most common fines are $5 plus court costs and $10 plus the cost of court. Court costs vary between $2 and $10. These fines and the fines reported which range between them account for 64 per cent of the fines imposed upon speeders by cities of 10,000 to 25,000 population; and 65 per

Table VIII

USE OF WARNING, SUMMONS AND ARREST IN SPEEDING CASES

Table VIII

Use of Warning, Summons and Arrest in Speeding Cases

Conditions Under Which Each Is Used			Per Cent of Each Reporting				
				Cities by Population Group			
Warning	*Summons*	*Arrest*	*States*	*10M–25M*	*25M–50M*	*50M–100M*	*100M and Over*
	All speeding cases		8.4%	25.3%	14%	28%	46.7%
		All speeding cases	—	17.3	25	14	9.4
Borderline cases	All over borderline		20.0	7.4	7	17.2	—
Borderline cases		All over borderline	8.4	3.7	—	2.4	—
Borderline cases	State residents	Out-of-state residents	20.0	2.5	2	—	—
	Local residents	Out-of-town residents	—	3.1	7	—	1.6
	Borderline cases	All over borderline	—	—	2	2.4	—
Within tolerance	All over tolerance		8.4	2.5	5	7.0	6.2
Within tolerance		All over tolerance	8.4	1.9	—	5.0	—
Within tolerance	State residents	Out-of-state residents	4.4	1.2	—	2.4	—
Within tolerance	Local residents	Out-of-town residents	—	—	5	—	—
Within tolerance	1st offense over tolerance	2nd offense over tolerance	—	0.6	—	—	—
	Within tolerance	All over tolerance	—	0.6	—	2.4	—
Out-of-state residents	State residents		—	4.2	—	—	1.6
Out-of-town residents	Local residents		—	—	2	5.0	—
	State residents	Out-of-state residents	4.4	8.0	—	—	9.4
	Local residents	Out-of-town residents	—	3.1	5	9.4	12.5
First speeding offense	Second offense		—	5.5	4	—	—
First speeding offense		Second offense	4.4	1.9	—	2.4	—
Speed too fast for conditions	All other speeders		4.4	—	—	—	—
Estimated speeds	Paced speeds		4.4	—	—	—	—
Before enforcement campaign	During campaign		—	—	2	—	—
	Up to 40 mph	Over 40 mph	—	—	—	—	3.1
	Up to 45 mph	Over 45 mph	—	—	—	—	1.6
	Up to 50 mph	Over 50 mph	—	1.2	—	—	4.7
	Up to 60 mph	Over 60 mph	—	—	—	—	1.6
Decision left to discretion of officer at time offense occurs			4.4	10.0	20	2.4	1.6
Totals			100%	100%	100%	100%	100%

cent of the fines imposed by the next larger group of cities—25,000 to 50,000. These fines of from $5 to $10 are used less frequently by the larger cities, being employed by 45 per cent of the cities between 50,000 and 100,000 population and by 39 per cent of all cities with populations 100,000 and over. These larger cities employ more flexible fines, the most common being a fine amounting to $1 per mile per hour by which the limit is exceeded. One city in the largest population group reported a normal speeding fine of $5 per mile per hour over the posted speed limit.

SUMMARY

Speed laws vary widely under similar conditions. Most of the policies and enforcement practices vary over equally as wide limits. This almost complete lack of uniformity in speed regulations and enforcement practices becomes a serious problem for the driver. The wider application of speed zoning practices is a sound approach in correcting the discrepancies in numerical limits.

The practice of pacing motorists in order to determine speed violations is almost universal. While laws do not require this, in all jurisdictions, it is common policy. The distances used in pacing violators range from as little as one block in business districts to as much as two miles in rural areas. In only a few states and cities is the practice of making speeding charges without pacing common.

Speed meters and other measuring devices are rarely employed for speed enforcement in states. However, more than 10 per cent of the cities report the use of such devices.

Concealed enforcement techniques are uncommon among state enforcement agencies. In the cities, there is a variation of from 26 per cent of the total enforcement effort to 50 per cent from the smaller to the larger cities.

Tolerances are allowed by both state and city agencies before arrests are made for speeding only. Generally, motorists are allowed to exceed numerical limits by 5 to 10 mph before being charged as violators. Again, however, wide ranges are observed.

In the smaller cities, automobiles are more commonly used for speed enforcement than are motorcycles.

The sedan is the favorite body style of automobile. Marked cars predominate over unmarked cars, although the predominance is less in smaller cities.

Many combinations exist in the use of the warning, summons, and arrest for speed violators.

Fines for speeding vary from $1 to a maximum of $200.

Traffic Administration

THEODORE M. MATSON

Theodore Matson is Director of the Bureau of Highway Traffic of Yale University. Mr. Matson took part in the early traffic studies for San Francisco, Los Angeles, Kansas City, and New York. He was formerly Traffic Engineer of the City of Philadelphia. Mr. Matson is a member of the Institute of Traffic Engineers, the Highway Research Board, the American Society of Municipal Engineers, and of the American Public Works Association. He is the author of technical papers on traffic and of the monograph, "War Worker Transportation."

CIVILIZATION becomes steadily more complicated. More and more people move into urban areas. Consequently the management of municipal affairs has assumed a vast importance. A major problem in today's municipal management is the administration of traffic and parking relief.

In the city, traffic problems reach their peak. In the city, approximately half our traffic fatalities occur and the strangled stream of motor vehicles causes tremendous property loss. They are losses not only from collision but from depreciated land value that results from inaccessibility of urban marketing areas for much of the population involved.

ESSENTIAL NATURE OF STREET TRAFFIC

Yet street and highway transportation is necessary for the demands of urban life and for its growth and development. It is economically essential that persons and goods be transported by street and highway. It is socially essential as well. Equally necessary are safety, convenience and efficiency in this transportation. Traffic accidents cause needless suffering and shamefully waste community resources.

Congestion is wasteful in itself, it destroys accessibility in the conduct of business of a city and it makes for aberrated patterns of land use. In the treatment of municipal traffic problems, therefore, accidents and congestion are to be avoided and safe, efficient traffic movement is to be sought.

IMPORTANT ELEMENTS RELATED TO TRAFFIC

In addition to the general problems of accidents and congestion found in the traffic and parking conditions of a city, the administrator will recognize that there are important component elements of direct concern which are intimately related to street use and safety. Among these are:

1. The purveyors of vehicle and parking services and the establishment of methods of dealing with parking problems
2. Freight-handling agencies including private, contract and common carriers
3. The local bus or street car company and the mass transportation problems involved therewith
4. Taxi-cab companies
5. Public utilities employing the street for transmission of other than surface traffic
6. Railroad depots and terminals where change from rail to road transportation occurs
7. Inter-city buses
8. The municipal airport and the ground link to air transportation of the city.

All of these elements are either public utilities or border on such service. All may exist in any given community and all of them are directly concerned in their operations with street use. They all contribute in varying degree to the traffic problem as a whole. Because of the commercial nature of these enterprises, they are particularly concerned with the facility and freedom of street use inasmuch as traffic and parking conditions definitely affect or influence the services which these agencies can render to their clientele. Moreover, the interrelationships of traffic and parking created by these agencies frequently create genuine administrative problems in municipal management.

OFFICIAL ADMINISTRATIVE AGENCIES IN TRAFFIC

The municipal executive in coping with traffic problems also finds that there is a multiplicity of boards, commissions, or department heads within his city, the functions of which definitely influence

or are closely allied to traffic improvement. Such agencies as the following are usually found within the city government and are engaged in work which inevitably affects the traffic conditions of the city. Among these are:

1. *The Police Department*—All traffic regulations require enforcement and the application of traffic regulation is largely dependent on the police department and the action which it takes in reference to traffic. The police in their daily work with problems of traffic law enforcement are in intimate contact with the public and have an intimate knowledge of traffic congestions.
2. *The Engineering Department*—Through the design, construction and maintenance of traffic facilities, the engineering department has at its command skills and knowledge which must be drawn upon to attack the traffic problem intelligently. In its design and supervision of the street system it determines the very nature of the facilities on which traffic is to move.
3. *The City Planning Agency*—The long-range planning and development of land use in the city is a function of the city planning agency. Because traffic is intimately correlated with land use and population density, the skills and work of the city planner must also be brought to bear on the traffic problems of the municipality so that the use of land for streets, parks, industry, housing, etc. will develop with sound traffic provisions.
4. *The Public Utilities Agency*—Public utilities are vitally concerned with street use and control. Because buses and street cars are such an important segment of the traffic stream itself, the problems and needs of mass transportation should be coordinated with other phases of traffic development.
5. *Street Lighting*—The agency in the city charged with street lighting not only needs traffic information to carry out its work intelligently, but the work which it does carry out is an important factor in the safety and convenience of traffic movement.
6. *Legal Department*—The City Attorney has special skills and knowledge of law and legal procedures and can render invaluable service not only in the drafting and codifying of simple traffic ordinances, but also in advising about the legal aspects of land acquisition, condemnation, and contractual obligations necessary for traffic improvement.
7. *Traffic Engineering Bureau*—Increasingly, municipalities are creating traffic engineering agencies. Through traffic engineering skills and techniques factual measurements of the traffic characteristics and conditions of the municipality are made and analyzed. On the basis of this specialized knowledge traffic regulations, designs, and plans are formulated in the light of actual and anticipated traffic demands.

MULTIPLICITY OF TRAFFIC INTERESTS

From the above listing, which is only suggestive and partial, it is clear that local transportation is a factor in nearly every aspect of municipal life. The organized official and unofficial agencies which are closely related to its handling are many. In addition to those elements set forth, the list could readily admit such unofficial groups as the retail merchants, the real estate board and such official agencies as the schools and the traffic courts.

TECHNICAL NATURE OF PROBLEM

Traffic fluidity with safety may be attained only through the quality of the vehicles, the route and terminal facilities, and the road users themselves. The qualities of vehicles, route and terminal facilities, and road users may be altered or controlled by means of education, enforcement and engineering measures. This control of traffic is a governmental responsibility which must be based on sound public policy. The use of education, enforcement, and engineering measures, *each in its proper proportion* to obtain traffic fluidity with safety, is a governmental responsibility which stems from the adoption of public policy on traffic matters.

In the formation of that policy consideration must be given, determinations made as to the restrictive and constructive measures which may be applied to traffic. This will require special knowledge, experiences and skills which embrace the operation of roads, vehicles, and road users, the causation and effects of traffic movement, the habits and operational characteristics of traffic, and the ascertainment of traffic necessities. In the light of this knowledge, traffic policies for any community may be shaped better and more intelligent consideration may be given first, to those restrictive measures which constitute the imposition of legal restrictions on the actions and freedom of road users, and second, to those constructive measures which constitute the creation of route, terminal and control facilities which will serve the traffic needs of the community functionally and better by accommodating the characteristic actions and preserving the freedom of road users.

It follows therefore that each community must formulate the strategy and tactics to be followed in the attack on its traffic and parking problem. Decisions must be made as to when and where further regulation, such as speed limitations, one-way streets, no left turns, signals, no parking, time-limit on metered parking, may be effectively applied on the one hand; or improved major streets, parkways, expressways, or parking lots, garages, or truck terminals may be most satisfactorily employed on the other.

NEED FOR TECHNICAL HELP

In seeking solutions to problems of this type, it should be apparent that technical help is needed. Lay opinions will not afford aggressive and positive solutions. As previously pointed out, it becomes necessary to have facts about the abilities and limitations of drivers and pedestrians, the operational characteristics of vehicles, and functional details for different streets and highway systems as well as the control of traffic conditions found thereon. Such facts would relate not only to the detailed nature of traffic elements, but also to the broad characteristics of the traffic stream and would include trends, growth and shifts in that stream. Financial studies and route and terminal inventories are also essential in the general development of traffic facilities in the community.

TRAFFIC ENGINEERING NEEDED

Traffic engineering as a branch of engineering is a relatively new field of study. Through it new skills and techniques have been developed which can be of tremendous help to the city officials in the improvement of traffic conditions. Traffic engineering services are valuable not only in the making of decisions, but also in the conduct of day to day work. In defining the work of traffic engineering, special attention is called to the following functions which comprise its scope and which the city administrator will recognize as being highly significant in the improvement of traffic conditions:

1. *The Collection and Analysis of Traffic Data*—The collection and analysis of all traffic, physical and economic data needed to measure existing and to estimate future street and highway characteristics and needs. These in-

clude origin and destination, volume, speed, accident, congestion, parking, and other characteristics of traffic movement.

2. *Traffic Restrictive Measures*—The traffic engineer has special skills and techniques needed in connection with the application of uniform regulatory measures to new as well as existing terminals. This regulatory work is vitally necessary for safe, convenient, and economic highway transportation. The effectiveness of these measures depends upon how well engineering techniques and analyses consistent with economic, legislative and enforcement limitations are applied. Traffic restrictive measures involve the application of one-way regulations, stop, through, signal, turning, parking, speed, and similar regulations. These should not be arbitrarily applied, but should be imposed only after thorough engineering study and analysis of traffic demands and characteristics.
3. *Traffic Design*—The interpretation of traffic performance and calculation of needs are essential to the proper design of efficient roads, interchanges, parking terminals and other traffic handling facilities as a branch of traffic engineering work. Traffic researches have already demonstrated their value in the improvement of street and highway design. It is through the study of traffic operations that the traffic engineer can render invaluable assistance in predicting the functional performance of new facilities.
4. *Traffic Planning*—Again because of the intimate knowledge of traffic characteristics and demands in a community, the traffic engineer is charged with the preparation and submission to proper authorities of traffic plans and recommendations which are based on analysis of comprehensive data for the proper location, function and operation of routes and terminals. It is to be remembered that highway transportation is a most important phase of the comprehensive plans of a city and it is intimately related to such things as land use and population distribution. Traffic data properly applied are necessary to justify the construction and location of expressways, new major streets, and parking areas.

It should be clear from this statement of traffic engineering that there is a logical, well-defined need for such services in seeking the solution of municipal traffic problems. While many diverse agencies of government deal with various aspects of the traffic problem, generally speaking, there exists no agency which is charged with or well-versed in these engineering aspects of traffic improvement.

ELEMENTS OF MUNICIPAL TRAFFIC ADMINISTRATION

The intelligent management of traffic affairs in the municipality requires the continuous guidance and control of the men and ma-

terials employed in the service of a municipal government, but in addition to the guidance and control of municipal agencies by administrative means, it must be recognized that local government in a democratic country such as ours requires also an understanding of the politics of the community which are concerned primarily with expressing the popular will. Thus in traffic work, as in every other branch of government, two distinct elements are involved. These are politics on the one hand and sound municipal administration on the other.

Administrative officials enjoying close harmonious relationship with policy formation officials for purposes of coordinating their mutual responsibilities, should nevertheless clearly segregate their functions and responsibilities of administration from those of policy formation. At the same time, the local city council should not concern itself with petty administrative details, but should address itself only to the broad problems involving community policies which are then to be applied by the administrative branch of government.

The principle of segregation of function applies not only to the administrative branch but also the legislative branch of government which rightly should be concerned with local politics. In traffic improvements particularly, it seems that either through the error of council in assuming many administrative functions or through the error of each administrative official in dabbling with traffic in his own sphere, without reference to other departments, the ordinary city does not enjoy a well-integrated, cohesive, balanced plan of traffic and parking improvement. Until such plan is effected, traffic conditions of municipalities will remain in a muddled state and will continue to increase in severity.

DANGERS OF CITY COUNCIL ASSUMING DETAIL WORK

The dangers of leaving to city council the many small details which could more properly be carried out by administrative agencies is generally recognized.

Certainly in traffic matters which touch so many so intimately, the "traffic constituents" of the councilman are a very real pressure on him. Moreover, the segregation of traffic policy from the ad-

ministrative details of traffic work is not easily understood by the constituents who want a traffic signal at their corner.

NEED FOR STAFF AGENCY IN TRAFFIC

Leaving politics then to the elected council or representatives of the people, attention is now turned to the administrative side of traffic control. Though there are many forms of municipal management in American cities, experience has developed three distinct types of organization. These are generally described as: (1) independent executive; (2) commission; and (3) manager form of government. Regardless of the particular form of government in any community, however, it is clear that the chief executive should be armed with knowledge of municipal affairs, the details of which are not ordinarily required in policy formation. Particularly when the executive is a layman elected by the people, it becomes especially necessary that the detailed information dealing with the administration of traffic control be thoroughly predigested for his use. In any event, however, whether the chief executive is a professional or a layman, some orderly arrangement is required to feed to the executive the detailed information on the conduct of city government in traffic and parking. This becomes necessary in order to direct the course of development and in order to meet the public intelligently. In other words, the chief executive of the city must have at his command a "staff" as distinguished from the "line" or departmental organization. This staff does not deal directly with the public—it works within the administration having relation principally with the chief executive and other departments.

The chief executive then should establish some orderly arrangement for acquiring the necessary information on the conduct of traffic affairs within the city. He needs this not only to direct the course of traffic improvements, but to advise council and to meet with the public. Such advice can render invaluable aid to the chief executive and to the council by furnishing information of vital significance. It will bring out the locations, times, causes, and nature of traffic accidents and congestion. It may suggest policies which are based on this information and above all will concern itself with the long-range planning for traffic improvements.

A TRAFFIC OR TRANSPORTATION COMMISSION

In most cities there is not a single agency which can review traffic conditions from the diverse viewpoints of those unofficial and official agencies which are immediately or indirectly concerned. Accordingly it becomes necessary to create some board, committee, or commission which can review various phases of the traffic problem from the diverse viewpoints of the principal agencies concerned with it. After review of a particular problem, such a group would be in position to advise the chief executive on all factors involved and to recommend a course of action to be followed. In the creation of such commission, full consideration should be given to all of the official and unofficial traffic interests set forth above. Thus, a single agency will be created which will continuously apply itself to the community problem of traffic and parking and which will recognize both the official and unofficial viewpoints of the diverse organizations which are concerned with traffic matters.

FUNCTIONS OF THE COMMISSION

These traffic agency representatives will be welded into a well-integrated, cohesive working group charged with the responsibilities of long-range planning and the scheduling of priorities of traffic work as well as the control of the quality and quantity of the work to be done by the line agencies. Such an official traffic commission will assuredly avoid buck-passing and under positive leadership will bring into close, harmonious relationship all agencies which are concerned with traffic problems. At the same time it will segregate the functions and responsibilities of each of the official agencies of government that has a part to play in the improvement of traffic conditions.

Such a traffic commission would not only be concerned with traffic and transportation planning and priorities within the local government, but would also be concerned with state-urban, as well as federal-urban, traffic and highway relationships. It would inquire into all matters necessary for the development of a clear statement of traffic and parking needs, so that it could state positively for the

public what will be needed and what may be done to accommodate persons and vehicles with optimum efficiency.

In order that this commission may function efficiently, its first job is to draft and adopt simple policies of procedures and areas of work. This is most essential to its continuing success. Without well-defined policies it is open to countless problems and ways of procedures which if allowed will frustrate positive development and action. Well-defined objectives and methods to be followed in attaining those objectives are essential to virile action.

FORMALIZATION NEEDED IN LARGER CITIES

In larger cities, particularly, it may be found quite advisable to create a department of transportation headed by a government officer in the mayor's cabinet or equal. He may be a departmental head under the city manager, or he may be a commissioner under some commission form of government. Through that office, decisions will be made to carry into fruition the steps which should be taken by the community along the lines of traffic planning, design and construction, regulation, enforcement, and education.

Again, this staff agency of government will correlate the work of the diverse line departments. For example, it is clear that the city planning agency of municipalities is obviously concerned with land use and has responsibilities for studying zoning, housing, land subdivision and control, parks and parkways, and any other subjects dealing with the growth and development of the city. Each of these has its traffic implications, and the staff traffic authority, therefore, should have the duty of reviewing the work of the planning agency insofar as it affects traffic and should have the authority to bring up for executive or legislative decision traffic matters which in its estimation are being inadequately or incorrectly planned for in any given proposal being studied by the planning agency of the city. Planning, of course, is a staff function. The same general duty of review, and evaluation by the traffic authority should be applied to line functions including engineering, enforcement, education, licensing and other phases of municipal government which affect traffic development.

With each duty and responsibility should belong the complementary power or authority. The extent of authority to be given to this single traffic commission will be found to depend largely on the character of the traffic agency itself as well as on the community characteristics of government. No single defined line of duty or authority can be prescribed for any community. It is as personalized to that community as raiment is to its wearer. In the conduct of its work, however, the traffic commission assuredly should be held responsible for the following functions:

1. The establishment of a sound organization through which the functions of the traffic authority can be effectively carried out with a maximum of satisfaction to the community.
2. The organization form which is developed and which will require recruitment, training and personnel management.
3. The planning for the future traffic development of the city.
4. The use of adequate equipment, control devices, and other implementation necessary to carry out its work.
5. The continuous coordination and control of the organization.
6. The conduct of research and investigation into technical problems.
7. The promotion of satisfactory public relations.

TRAFFIC WORK IN THE MUNICIPALITY

Among the detailed phases of the work which must be carried out within the urban areas for sound development of traffic and parking improvements are the following:

1. Traffic surveys and road use studies including accident analysis.
2. The application of traffic control devices including street and highway lighting and all matters relating thereto.
3. The rules and regulation of road use, such as speed control, one-way streets, stop streets, parking regulations, etc.
4. The geometric design of traffic facilities.
5. The issuance of permits for driveways and entrances, as well as the operation of over-size and over-weight vehicles.
6. Traffic route and terminal planning.
7. Research into the driver, vehicle and traffic characteristics as they influence street and highway design, construction, maintenance, and overall performance.

8. The economics of traffic including relationship of traffic facilities to land values, taxation, etc.
9. Traffic routing.
10. Complaints relative to traffic and accidents.
11. Public education in all traffic matters of street use.
12. The enforcement of traffic law.

While these above items are broad and govern a wide field of endeavor, they are related specifically to traffic conditions and operations within the city. This type of day-to-day line work will require the application not only of already-existing agencies of government but the creation in most areas of a traffic engineering agency which has been described heretofore and which should be charged with many of the functions coming under the above list. It is through traffic engineering studies that the traffic commission can be kept advised of traffic operation conditions within the city and can correlate these conditions with the work and activities of all agencies which have an interest in the traffic problem.

SUMMARY

In summary then, sound traffic and parking administration requires the same tools as other branches of municipal management. Politics and policy formation should be clearly segregated from the execution and administration of such policies. In the execution and administration of a sound traffic policy for a community, however, it becomes necessary to create a staff agency composed of those official and unofficial agencies within the community that have a genuine interest in and responsibility for traffic operation in the street and parking facilities of the city. This staff function, of course, is charged with the job of evaluating, studying and coming to conclusions as to priority, quality, and amount of development which is desirable to carry out an effective community policy.

But in addition to policy formation and the decisions of planning work, it becomes necessary to have a traffic engineering agency, the prime function of which is to make continuing studies of street and highway characteristics within the community, develop plans and study the application of rules and regulations affecting traffic con-

ditions, reviewing the design of planned improvements insofar as their operational characteristics are concerned and collecting and analyzing data as requested which is needed in the planning of future traffic developments of the city.

CRITIQUE

No municipal government is any stronger or any better because of its form or administrative organization, unless it can carry to fruition in a thorough, uniform, simple and continuous manner the wishes of the public at large. In traffic regulation, one of the most common errors is uncovered when Joe Doaks, the citizen, honors such regulations more in the breach than in the observance. In many areas, for example, municipal administration, either through the legislative or executive branches of government, has adopted parking regulations which in the final analysis become unenforceable against the citizens. Traffic signs are frequently posted which are of no significance whatever to the passing street user. Splendid theories of driver licensing are embraced which cannot be transformed into practicable measures by the branch of government designed to so transform them because the citizens themselves do not wish the resultant restrictions imposed. Impressive designs of traffic facilities may be constructed which result in utter confusion to the public. Ideal plans are too often drawn with little or no regard for the financial purse strings of the citizens. It is submitted therefore that a few well-conceived traffic policies applied uniformly, and of such simplicity that they are generally acceptable, are far better than elaborate schemes which may seem logical to the experts but in the final analysis of daily use prove to be utterly incomprehensible to the citizens and accordingly, unenforceable and inapplicable.

The Garden City Parking Plan

ALLAN H. ROGERS

Allan H. Rogers has been Superintendent of Public Works of Garden City, N. Y. since 1934. He is a member of the American Public Works Association. He was instrumental in the layout construction of Garden City's parking plan from its beginning.

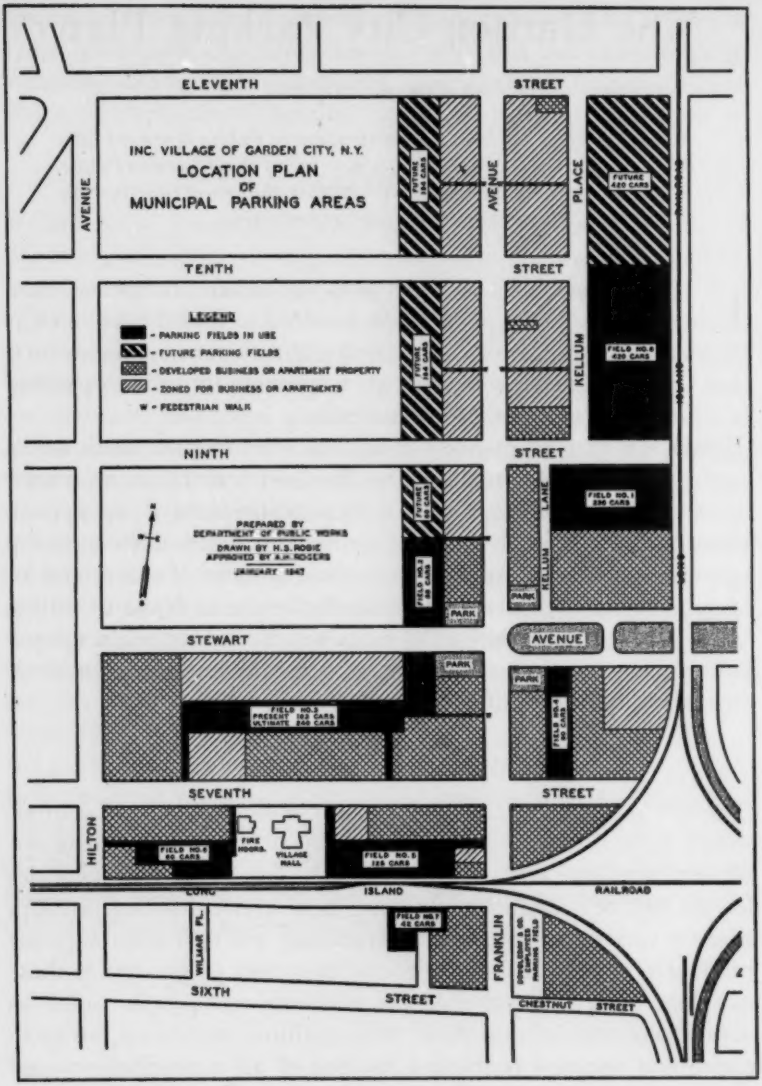
In 1869, Alexander T. Stewart paid $55 an acre for several thousand acres of waste plain lands on which to found Garden City. He probably did not forsee that in less than seventy years his total land cost would barely be enough to provide immediate parking facilities in the village that was to result.

But Mr. Stewart planned wisely and well, and his ideals for "a garden city" were carried on, first by deed restrictions and, after incorporation as a village in 1919, by a comprehensive zoning ordinance, to the end that the community, now at about half its maximum potential population, retains an unusual amount of charm and atmosphere. Located in the approximate center of Nassau County, Long Island, some twenty miles from New York City, it has a population of 13,000 and a business section which gives promise of developing into the "Fifth Avenue" of Long Island.

EARLY PARKING EXPERIENCE

Our first parking experience came at the several railroad stations where, following incorporation, adjacent properties were acquired by gift, purchase and condemnation to provide parking facilities for the cars of commuters. By 1929 these station parking facilities became very congested, with detrimental overflow onto adjacent residential streets, and it was found that over 50 percent of these cars were owned by non-residents, with our own people unable to obtain accommodations. After new enabling legislation, an ordinance was adopted restricting the use of all municipally-owned parking areas at the railroad stations to residents and property owners, upon the payment of a nominal license fee of $1 a year.

This procedure was deemed only fair and proper, inasmuch as


INC. VILLAGE OF GARDEN CITY, N.Y.
LOCATION PLAN
OF
MUNICIPAL PARKING AREAS
LEGEND
- PARKING FIELDS IN USE
- FUTURE PARKING FIELDS
- DEVELOPED BUSINESS OR APARTMENT PROPERTY
- ZONED FOR BUSINESS OR APARTMENTS
W - PEDESTRIAN WALK
PREPARED BY
DEPARTMENT OF PUBLIC WORKS
DRAWN BY H.S. ROBIE
APPROVED BY A.H. ROGERS
JANUARY 1947
ELEVENTH STREET
TENTH STREET
NINTH STREET
STEWART AVENUE
SEVENTH STREET
SIXTH STREET
CHESTNUT STREET
AVENUE
PLACE
KELLUM
LANE
HILTON
WILMAR PL.
FRANKLIN
LONG ISLAND RAILROAD
FUTURE 420 CARS
FIELD NO. 6 420 CARS
FIELD NO. 1 234 CARS
FIELD NO. 2 PRESENT 182 CARS ULTIMATE 240 CARS
FIELD NO. 3 125 CARS
FIELD NO. 4 80 CARS
FIELD NO. 5 90 CARS
FIELD NO. 7 45 CARS
PARK
FIRE HOUSE
VILLAGE HALL

these station parking facilities were acquired, improved, and maintained entirely at general village expense, and were all located in high-class residential sections. These station parking fields were carefully planned and landscaped to protect and enhance the adjacent properties, and our investment in their acquisition and development amounts to date over $158,000. They have been improved and expanded over the years, so that now, at the four major stations, we have licensed parking spaces for 294 cars, and an ultimate capacity estimated to be sufficient to meet our needs when the village approaches maximum population.

GROWTH OF THE BUSINESS DISTRICT

Until about 1930, the business district was quite small, confined principally to essential shops, and residents patronized either New York City stores or the larger business sections of neighboring villages. Garden City's tradition, its geographical location, its undeveloped but still centrally located business section, and other factors all naturally contributed to an expansion of business which, heightened by the establishment of suburban branches of several New York City stores, brought motor vehicles from a large trade territory to add to the growing local traffic.

Our streets, due to original planning foresight, were amply wide for moving traffic, but in common with all streets would provide insufficient curb parking. The problem was accentuated by the fact that 80 percent of the zoned business property lay along the primary north-south traffic artery, and that the intersecting side streets were developed with fine homes so that parking thereon could not be considered.

A few of the stores at first provided, or attempted to provide, limited off-street parking for their patrons, but it was obvious that this was not the solution, and such procedure was permitted only as an interim arrangement.

APPROACH TO THE PROBLEM

In 1930, village authorities recognized the need of providing for the establishment of municipal parking areas in the vicinity of busi-

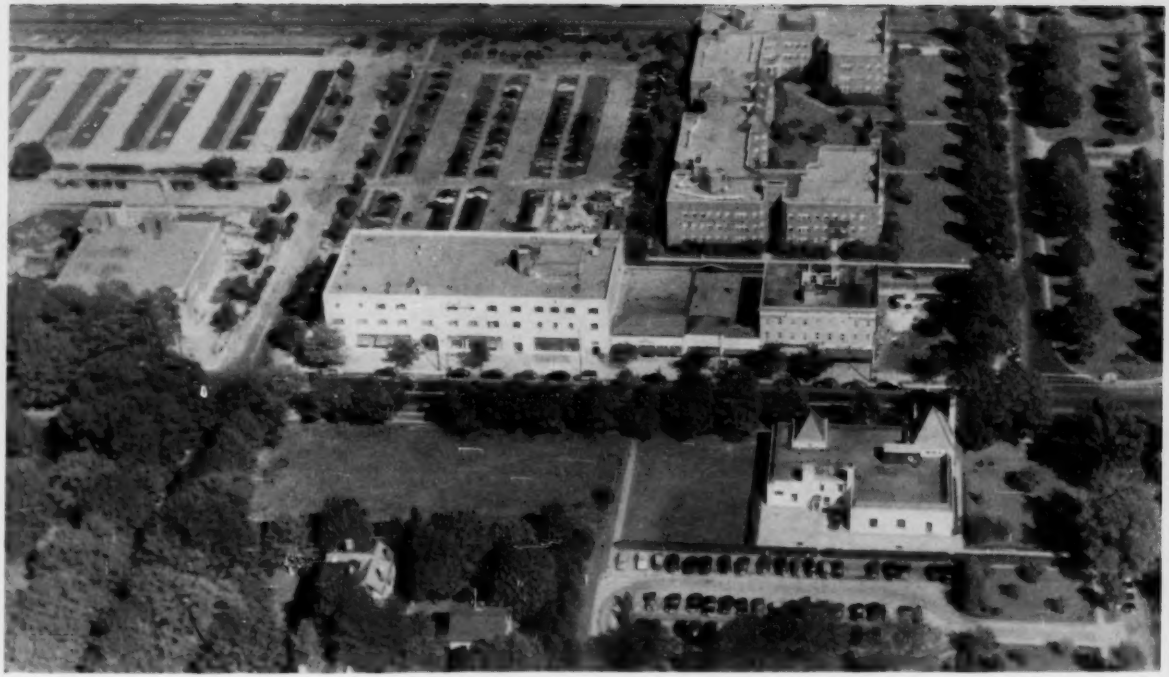
ness and adjacent apartment house properties, and devoted a considerable amount of time to a study of this problem for the purpose of devising a plan which would encourage the proper development of these districts and serve the best interests of the village as a whole.

Several tentative plans were prepared, all somewhat similar in the rejection of the common parking lot serving a considerable area, the principal thought being to locate the parking facilities in the rear of the properties they were to serve, or at least as close thereto as was reasonably possible. This method promised several objectives, namely utmost convenience, minimum property depreciation, and minimum cost because of acquisition of rearage instead of valuable frontage.

At public hearings preliminary to establishment of the project, considerable early opposition was recorded by residents and owners of residential properties in the immediate vicinity of the business district, it being their contention that (a) their properties were not benefited and should not be assessed, (b) no parking should be established in the rear of business properties abutting residential districts, (c) the proposed acquisition was far in excess of the area even ultimately needed to serve the business district, and (d) the establishment of the parking areas would encourage the growth of the business districts to the detriment of the adjoining residential areas.

The objections were given careful consideration, but the only concession, if it may be so called, produced the formula that the cost of acquisition of the land would be assessed against the business and apartment property benefited, while the cost of improving the parking facilities would be borne as a general village expense, with no assessment against neighboring residential property although we were then convinced, and it has now been demonstrated, that these properties were protected rather than impaired.

We felt that the provision of adequate off-street parking areas was a public responsibility, and that the attempted solution should not be left to private initiative. This conclusion was upheld by the courts in ruling that providing parking facilities is a proper municipal function. Other interesting and new points of law confirmed in litigation resulting from our pioneering in this field included the right to assess the acquisition cost, and the right to acquire more



Aerial view taken in fall of 1946, showing Field No. 2 in foreground, Field No. 1 in center background, and Field No. 8 (under construction) in left background

land than was immediately needed, in order to plan for reasonable expansion.

Due to the depression, action on the matter was temporarily held in abeyance. It soon became apparent, however, that the congestion of traffic due to the parking of motor vehicles on streets and private property in the business district and in the residential districts immediately adjacent thereto, was increasing so rapidly that further delay in the matter would be inadvisable.

In 1936, a definite parking plan to serve the established business and apartment house section was drawn up. This plan was designated "Section No. 1," being part of a long-range plan to make similar provision for all business property as required, and it had the consideration and approval of the several property owners' associations and the Chamber of Commerce.

During the early part of 1937, the Board of Trustees adopted the necessary resolutions directing the acquisition of the property, and title was vested in November of that year. Construction was pressed, with all work being completed by June, 1938, at which time appropriate dedication ceremonies were held.

THE FIRST FIELDS

Section No. 1 required the acquisition of about 7 acres of land at a cost of $143,165.58, which included $116,000 for direct damage, $11,900 for consequential damage, and the balance for legal and similar expenses; this may be compared with an assessed valuation of $93,000 for the property taken. The total was apportioned as an assessment against the adjacent business and apartment properties at rates ranging from $28.98 to $57.96 per $1,000 of valuation, with the option of paying the assessment in full or over a period of ten years. Six parking fields were constructed on this land, at general village expense of $44,562.55, with an immediate capacity of 733 cars and an ultimate capacity of about 10 per cent more. This resulted in an over-all cost of about $250 per car, and was felt to be a reasonable and sound investment in the future of the community.

Before Section No. 1 was fully completed, the increased patronage of the stores was such that some expansion was required, and

additional property was acquired to expand one field and to create a seventh field, so that the total capacity was raised to 853 cars.

These fields proved adequate to serve the increasing and very satisfactory development of the business district until the war years, when construction came to a standstill and traffic decreased, and the reaction of all concerned—those who "paid the bill," those who patronized the fields, those who lived nearby—was such that no changes were necessary in our plans for continuation of the program.

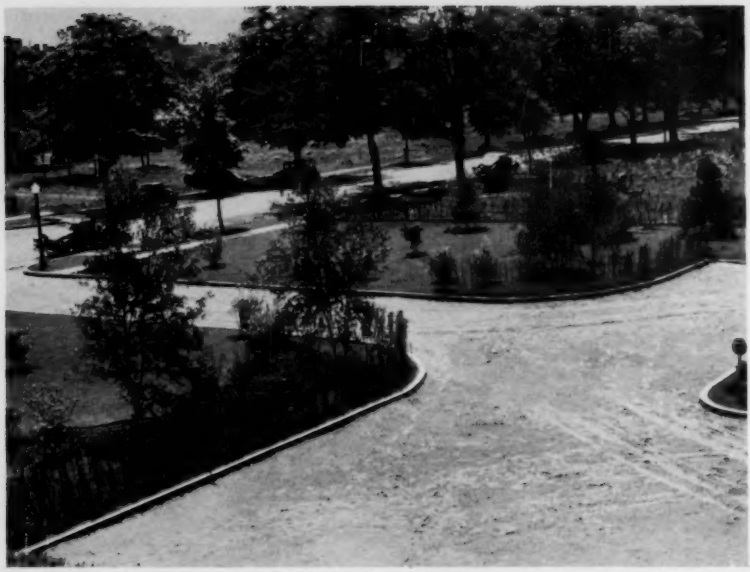
In contrast to our station parking, no license is necessary and no charge is made for this business parking; and only minor regulations and routine policing have been necessary to prevent abuse.

THE PLAN IS CONTINUED

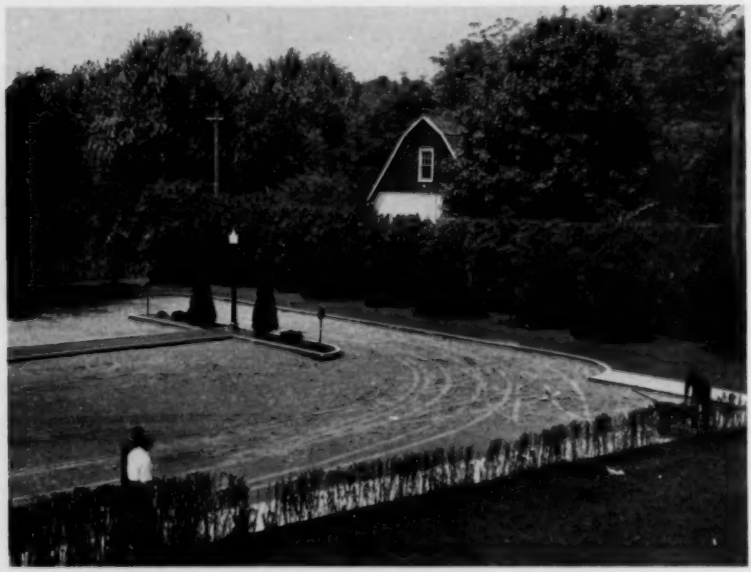
With the ending of the war, several large stores began construction, and plans for others were in the preliminary stage, so that the Village without delay moved to provide parking fields immediately required therefor and at the same time to insure adequate areas for the forseeable future. Plans which had been prepared for Section No. 2 were filed, and the property was acquired in April 1946; the program was so thoroughly acceptable that condemnation was only necessary for one parcel, all other property being acquired at a price agreed upon by prior stipulation.

Section No. 2, which provides land reserved for future parking fields parallel to the main thoroughfare and about two blocks in advance of the present business development, will undoubtedly meet our major business parking needs for the next ten years, and will provide space for 1228 more cars.

The land and acquisition cost for Section No. 2 was $73,596.32, of which $66,627.53 was for direct damage and $6,968.79 for legal expenses and interest, with no consequential damage. This is approximately 21 cents per square foot for the 8 acres acquired. Following the original formula, this cost was assessed against the business property directly abutting, at a uniform rate of $140 per $1000 of assessed valuation; this rate is substantially higher than for Section No. 1, despite lower land cost, because the assessment area for Section No. 2 was much more limited and was generally vacant land.



Entrance to Field No. 2, designed primarily for department store patrons and employees. Abuts residential property on two sides. Note 75 ft. landscaped setback conforming to Zoning Ordinance.



North end of Field No. 2; typical screen planting against residential property

In Section No. 2 we have already constructed one parking field with a capacity of 420 cars, at a cost of $24,000, and the balance of this section will be improved concurrent with the business development. These figures indicate an ultimate overall cost per car of about $125 for Section No. 2, or just about half our earlier cost in Section No. 1.

The total capacity of existing parking fields is now 1276 cars, and the ultimate capacity is 2141 cars, and when street parking is added and turnover is considered, it is readily apparent, by computation and by observation, that any reasonable needs of our own residents and of our various business interests have been, and will be, provided for.

COMMENTS ON SOME DETAILS

Several unusual features have entered into the design of these parking fields, dictated by our belief that they should be as attractive and convenient as possible, an asset rather than a nuisance to abutting residential property, free from the necessity of attendants or other than routine policing, usable by delivery trucks without interference to patrons, provide for all-night parking for those fields in the vicinity of apartment houses, and preserve our own zoning regulations. All front yard setbacks required for buildings by the zoning ordinance have been observed, this setback in some instances amounting to 75 feet.

All areas not used for parking or driveways have been attractively landscaped, and dense screening has been planted on those sides of the parking fields adjacent to residential property. Each field has been treated in an individual manner, to retain as far as possible a natural appearance and yet meet the needs of the business property served. Existing trees were maintained wherever possible and incorporated into the layout of the particular parking field; other trees were planted in field interiors to break up any barren effect. Either landscaped islands or attractive wood fences have been used to indicate the termination of the parking zones, and these, coupled with a minimum number of standardized signs, have eliminated the necessity of parking lines, attendants, etc.

Where parking fields were immediately in the rear of business

buildings requiring rear-door deliveries, a combined sidewalk and ramp was constructed permitting trucks to back up to the rear door of the stores, and parking is prohibited along this walk. As little frontage as possible was acquired, and an effort was made to keep the access driveways away from points of congested street traffic. Both one-way, two-way, and divided driveways have been used. In several instances mid-block walkways 5 ft. wide were constructed from the parking fields to the main business street, to make these fields more accessible to the stores on the opposite side of the thoroughfare and so avoid driving from one parking field to another. Interior drives of adequate width have been provided in all fields, and sidewalks constructed as barriers between parking lanes, to avoid as far as possible the dented bumpers, dented mudguards, and dented human tempers that have been one objection to mass parking. These walks are sufficiently wide to permit their use even with car overhang from both sides. The width of interior driveways, and the depth of car stalls, have been on the generous side, to facilitate parking, which is 90-degree throughout, and to provide snow storage space, so that immediate snow removal, which can be a very real problem in large parking fields, gives us no concern. Ornamental lighting has been provided.

CONCLUSIONS

On the completion of our first fields, comment was made that Garden City, in developing a distinctive and original system of parking fields, was setting a pattern for business districts of the future. We have been gratified by the large number of requests for information about our plan, and its successful acceptance, in whole or in part, by other municipalities. We are satisfied that our original plan, both as to development and to distribution of cost, was eminently sound and the best possible solution of our particular problem, and we have had to make no significant changes in the full projection of our complete program.

The Garden City plan is no cure-all for the parking problem, for which there can be no hard and fast rule. There were unquestionably certain special conditions which made it easier for us to put our plan into effect than would be the case in other communities, but

there are also a number of features in our general approach to the problem which will most certainly be of advantage to others even where our particular conditions do not prevail. Time is of the essence —in the realization of the problem, in immediate corrective action, and in preparation of the long-range program. Had we delayed even a few years, our solution would not have been as effective and certainly would have been far more expensive, and irreparable damage to business and residential property alike might have occurred.

Our plan makes the rear exposure of a business plot, for store purposes in particular, almost as valuable as the front exposure, with consequent increased assessments for tax purposes. It serves to bring business where the municipality wants business, and where the resulting traffic can be handled, without indiscriminate development.

Forming an attractive buffer between business and residential zones, these parking fields will prevent the usual gradual deterioration of neighboring residential property values. Integrated with the zoning ordinance, it can prohibit private parking and restrict certain business and uses unless adequate parking facilities are available. It has resulted locally in large manfacturing concerns providing comparable off-street parking facilities for employees only, and in the establishment of similar facilities for churches and places of public assembly.

We feel that the interests of our residents have been served and that their property has been protected against any deteriorating encroachment by business or its accompanying traffic. At the same time, we feel that we have enhanced the value of our business property and encouraged its orderly development to the end that we can be proud of the consummation of the early hopes for a planned community.

Traffic Accidents in 1946

SIDNEY J. WILLIAMS

Sidney J. Williams is assistant to the president of the National Safety Council, Chicago. He is a member of the executive committee of the National Conference on Street and Highway Safety and a member of the Board of Consultants of the Eno Foundation. In 1938, Mr. Williams received the C. I. T. Safety Foundation grand award for the greatest contribution to public safety. He is a member of the American Society of Civil Engineers and of the Institute of Traffic Engineers.

THE YEAR just closed witnessed the most sudden and definite drop in our traffic accident rate in many years. What conclusions can be drawn that will be helpful in our continued attack on an accident toll still tragically and unnecessarily high?

The number of deaths[1] from motor vehicle traffic accidents in continental United States in each month of 1946, 1945 and 1941 (the last prewar year)[2] is shown in Table I. As expected, the ending of the war and of gasoline and other restrictions in 1945 caused traffic volume and accidents to return to prewar levels. In May, 1946, however, the monthly figure dropped some 20% below 1941 and continued at this lower level through December.

This decrease below 1941 cannot be attributed to less travel. Traffic volumes in 1946 equalled or slightly exceeded those in 1941. Beginning with May, the 1946 monthly mileage death rates, shown in Table II are at least 20% below those of 1941. The death total in 1946 was at least 5,000 less than it would have been at the 1941 rate.

Let us examine the factors which may have influenced these 1946 national death rates.

1. *Seasonal Fluctuations.* Other than the drop which began in May, the 1946 seasonal death rate curve was not materially different from those of 1941 and other "normal" years.

[1] Human and economic losses from permanent and temporary injuries and from property damage are even greater than from deaths, but only the latter are reported with sufficient uniformity to justify nationwide year-to-year comparisons.

[2] While the 1941 death total was the highest ever, the mileage death rate (12.0) was about the same as the four year average, 1938–41 (11.7). Hence 1941 is taken as typical of recent prewar experience.

Table I

MOTOR VEHICLE TRAFFIC DEATHS

	1941	*1945*	*1946*
January	2,850	1,900	2,890
February	2,636	1,680	2,550
March	2,764	1,930	2,800
April	2,630	1,830	2,530
May	3,034	1,740	2,420
June	3,114	1,940	2,390
July	3,289	2,050	2,520
August	3,954	2,520	2,950
September	3,746	2,780	2,860
October	3,903	3,220	3,090
November	3,909	3,220	3,160
December	4,140	3,270	3,340
TOTAL	39,969	28,080	33,500

Source: All 1941 figures, and 1945 total, from U. S. Census Bureau. All others, National Safety Council estimates from state reports.

Table II

MILEAGE DEATH RATES*

	1941	*1945*	*1946*
January	12.1	11.2	12.4
February	12.0	10.9	11.4
March	10.8	10.1	10.5
April	9.4	9.7	8.5
May	10.0	8.6	7.9
June	11.0	9.4	8.0
July	10.6	9.6	7.6
August	12.5	10.4	9.1
September	13.0	11.4	9.8
October	13.4	13.6	10.1
November	14.6	14.1	10.9
December	14.9	15.0	11.7
TOTAL	12.0	11.3	9.7

Source: Death figures from Table I. Public Roads Administration mileage estimates.

* Per 100,000,000 vehicle miles

2. *Urban-Rural; Age Groups.* Mileage death rates differ between urban and rural areas and (probably) among the different age groups; hence any large shift between such areas or among such groups would affect the total rate. There is no reason to think that these or any similar shifts occurred, between 1941 and 1946, to an extent which would affect this analysis.

3. *Condition of Vehicles.* The average age of vehicles increased greatly (about 100%) during the war, and there is no reason to believe that this trend has yet been reversed. Greater age, combined with shortages of repair parts and labor, undoubtedly increased the hazard of vehicular defects; this is verified by the rise in the percentage of accidents in which such a defect was reported as a contributing cause.

4. *Condition of Highways.* The statements in the preceding paragraph also apply substantially to the condition of roads and streets. The impossibility in wartime of adequately maintaining pavement surfaces, shoulders, markings, control equipment, etc. undoubtedly increased the accident hazard. The building of new, safer highways has been almost at a standstill.

5. *Traffic Departments.* Traffic police, driver licensing, engineering and educational personnel were seriously depleted during the war. Recovery since V-E Day has been gradual; at the year's end, many of these departments equalled and some exceeded their prewar strength.

6. *Quality and Support of Traffic Safety Work.* Through the persistent efforts of official and other groups, the *quality* of engineering, enforcement and educational work continued to improve during the war even though the *quantity* of available personnel was limited. The number of states and cities using improved techniques, and the number of organizations and agencies supporting such measures, were considerably larger in 1946 than in 1941.

7. *Speed.* Average and maximum speeds on the highway have gradually risen from the low points of late 1942 but probably have not yet fully returned to prewar levels. Whatever the reason for this fact, the effect on fatal accidents and death rates has undoubtedly been beneficial.

8. *Other Driving Practices.* The same influences (enforcement,

patriotic appeals, self-interest) which served to reduce high speeds have probably caused the average driver to be somewhat more cautious.

Summarizing these relatively long-range influences, it seems clear that the deteriorated condition of vehicles, highways, and traffic forces (items 3, 4 and 5 above) tended to increase the number and rate of accidents and deaths in 1946 while the advance in accident prevention techniques and in public support, lowered speed and generally more careful driving (items 6, 7, 8) had the opposite effect. As the monthly death rates in late 1945 and early 1946 were almost the same as in the corresponding months of 1941, the one set of influences seemed then to have balanced the other. Had this article been written eight months ago it would have stopped right here, with the concluding observation that better safety work and better driving had averted the accident increase which war-worn vehicles and highways would otherwise have produced.

WHAT HAPPENED LAST MAY?

But in May, 1946, something happened.

This is most clearly evident from Table III which shows the percentage change in the mileage death rate in each month of 1946 compared with 1941. For those who mistrust rates, or the accuracy of mileage estimates on which rates are based, the changes in actual number of deaths are also shown. The two columns are closely parallel because there was in most months so little difference between the monthly mileages in the two years.

The sudden drop to minus 21% in May, continued without interruption thereafter, can only be ascribed to a set of influences not heretofore mentioned.

9. *President's Highway Safety Conference.* This large gathering, and the extensive nationwide publicity which preceded and followed it, focused official and public attention on (1) the large, increasing accident toll and (2) the simple, standard, proved preventive program. The figures in Table III indicate clearly that there was an *immediate* reaction: better driving, better enforcement, or both.

10. *State Conferences.* That this immediate effect did not soon vanish must be credited largely to the maintenance of interest through the state conferences held during the remainder of the year in about half of the states.

Table III

1941–1946 CHANGE

	Mileage Death Rates	*Deaths*
January	+ 2%	+ 1%
February	− 5%	− 3%
March	− 3%	+ 1%
April	−10%	− 4%
May	−21%	−20%
June	−27%	−23%
July	−28%	−23%
August	−27%	−25%
September	−25%	−24%
October	−25%	−21%
November	−25%	−19%
December	−21%	−19%

11. *Impetus to Long Range Programs.* No meeting or series of meetings, however august, can change the habits of the American people. The national and state conferences seem to have been not merely "something added" but something which has *multiplied* the interest and the efforts of innumerable official and other agencies which were in need of such encouragement.

12. *Other Influences.* The favorable trend was undoubtedly helped by the checking, at least, of vehicle and highway deterioration, the gradual rebuilding of traffic departments, the police "car check" campaign, and the expanding safety programs of various organizations.

HOW ABOUT 1947?

Many questions suggest themselves to every thoughtful student of our traffic problems. Why didn't we do it before? Have we reached the irreducible minimum? How long will the honeymoon last? With

no attempt at full answers, and certainly with no gift of prophecy, these comments are offered.

1. The President's Conference and all its corollaries would have been not only futile but impossible had it not been for the decades of patient effort in developing, testing and applying the detailed techniques of accident recording and analysis, highway and traffic engineering, police and court operation, driver licensing, driver training, vehicle design and maintenance, public education, and organized public support. The conferences provided a much needed "shot in the arm," just when it was needed most.

2. When some states have death rates only half the national average, and these states are the first to say that even they could do much better, we are a long way from having reduced our traffic losses to a point tolerable in a civilized society. If we ever reach an irreducible minimum it will be when bad driving is no more frequent and no more fashionable than burglary.

3. The monthly deaths and death rate—and all the other accidents—may bounce up again before this article is in print. Or they may continue downward. What happens in 1947 and thereafter will depend mostly on how well all of us do what we said we were going to do, last May.

Influence of Parking on Accidents

WILBUR S. SMITH

Technical Advisor, Eno Foundation

TO SAY that there is not enough "curb space" or storage capacity for parking requirements may be a commonplace expression, but it must be repeated here, for the emphasis of this discussion is on "The Relation of Parking to Traffic Safety."

There is hardly a citizen today who isn't "traffic conscious" but it would be hard to say which is more exasperating to him: the hindrance to and the danger of free movement on the highways, or the game of hide and seek for a spot to safely park his car.

His car may be the means of his livelihood or temporarily the means of pleasure and vacation from his daily task and he fails to understand why the use of a machine so essential to his life, in pleasure and in work, should necessarily be accompanied by so much drudgery, danger and delay.

He is one more citizen who fails to understand that he contributes to, as well as shares, the hazards of motoring.

In research and discussion of traffic congestion, parking and insufficient storage space have come to play an important part but in past studies of contributory causes of traffic accidents, the "Influence of Parking on Traffic Accidents" has not been fully taken into account.

Curb parking is expensive beyond computation, and contributes more than any other one factor to traffic congestion. It is a traffic maxim that any obstacle to traffic movement creates congestion and it is equally true that congestion causes accidents.

Accidents and hazards involving vehicles parked at the curb should be considered in every parking study. Reliable data on all such accidents are valuable in determining proper correctives and are an aid in encouraging the adoption of corrective measures and their application.

Much of the information contained in this article was originally presented at the National Safety Congress, Chicago, Illinois, October, 1946. The author is deeply indebted to the many persons who contributed data and examples.

The influences of parking on traffic safety are manifest but they are not always direct, and it is not always possible to prove these indirect contributory causes created by parking. This is often true where there was no physical contact with a parked vehicle.

Many factors enter into most traffic accidents, of which parking might be only one, and the accident coverage in reporting, while often incomplete, is so variable that it appears safe to say that parking plays a part in more accidents than available records indicate.

It is hoped that the information reported in this article will point the way to fuller reports on accident facts and their wider utilization in dealing with curb parking studies. Obviously, such data could be advantageously applied to many local problems.

FACTS ABOUT PARKING ACCIDENTS

General Involvement of Parked Vehicles in Accidents

In both cities and states, collisions involving parked cars (including parking and unparking) constitute a substantial part of all accidents. The latest information compiled by the National Safety Council[1] shows that 9.2 per cent of all accidents in urban areas and 4.5 per cent in rural areas involved parked cars. To these data can be added several others related to parked vehicles: 5 per cent of the urban accidents involved cars leaving parked positions, 1.1 per cent of the rural; 2.6 per cent of the urban and 3.9 per cent of the rural mishaps involved cars stopped in traffic. It is evident, then, that approximately 17 per cent of city accidents and 10 per cent of rural accidents involve vehicles which are parked, maneuvering into or from a parked position, or stopped in traffic. Only 1.3 per cent of urban and 2.5 per cent of rural fatal accidents involve parked cars.

Five per cent of the pedestrians killed in cities and six per cent of those killed in rural areas entered the roadway from behind parked cars. Nine per cent of the pedestrians injured in each area came from behind parked vehicles.

Parking accidents in ten large cities in 1940 ranged from 5 per cent to 28 per cent of all accidents reported.[2]

[1] Accident Facts, 1946. National Safety Council pp. 65–66.

[2] "Accidents Due to Parking in Congested Areas"— L. E. Bender, Thesis, Bureau of Highway Traffic, Yale University, 1940.

Studies made by the Massachusetts Department of Public Works[3] in six cities show that rear-end accidents involving parked cars range from 1.5 per cent to 11.5 per cent of all reported accidents.

A study of accidents on five blocks of the downtown district of Montvale, New Jersey, revealed that parking maneuvers were directly involved in 7 of 25 accidents. These accidents are shown graphically in Chart 1. This is an excellent example of cumulative data.

Recent figures from Flint, Michigan[4] show that 12.3 per cent of the accidents in the business district involve parking. In 1945, Seattle, Washington reported that 12.9 per cent of all its accidents involved parking operations.[5]

A survey of rural accidents in 12 states indicated that accidents involving parked or stopped vehicles constitute 12.4 per cent of all rural accidents, with a variance between the 12 states from 6.6 per cent to 16.3 per cent.[6]

Figures for rural accidents in 1946 on state highways in South Carolina[7] show that 7 per cent of them involved vehicles parked or standing. Vehicles stopped on roadway or in a parking maneuver were noted in 10.7 per cent of the accidents.

Many parking accidents occur on some of the best highways. One of the nation's finest highways, the Merritt Parkway, has many accidents involving parked vehicles: From June, 1938 to July, 1940, seventeen per cent of all accidents involved parked cars; from May, 1945 to April, 1946, twelve per cent of all accidents involved parked cars. During some years of the war period, one-fifth of all accidents on this road involved parked vehicles.

A recent study of accidents involving Army vehicles[8] indicates that 3 per cent are attributed to unsafe parking, and approximately an additional 7 per cent to unsafe backing from parking spaces. About 10 per cent of these accidents, then, are of the parking type.

[3] Data from Mr. E. F. Copell, Traffic Engineer, Massachusetts Department of Public Works.

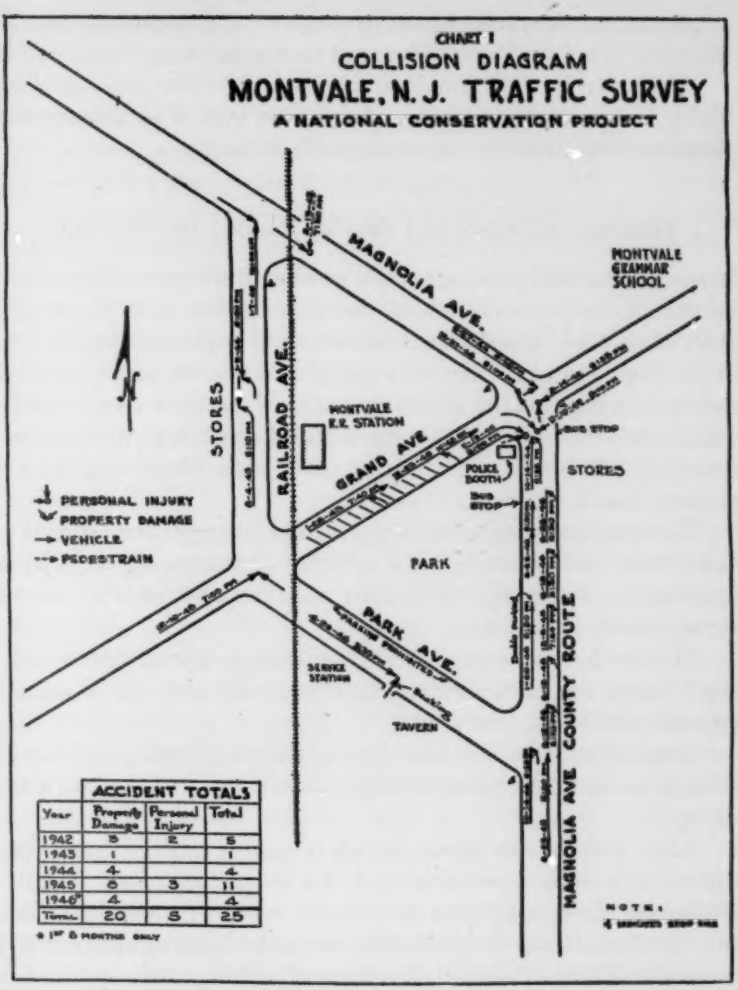
[4] Data furnished by Mr. Henry A. Barnes, Traffic Engineer, Flint, Michigan.

[5] Information obtained from Mr. Arch Bollong, Traffic Engineer, Seattle, Wash.

[6] "Accidents on Rural Highways Due to Parking"—W. W. Davis, Thesis, Bureau of Highway Traffic, Yale University, 1940.

[7] Information furnished by South Carolina State Highway Department.

[8] Figures supplied by Mr. R. S. Holmes, Safety Branch, U. S. War Department.



Courtesy of the National Conservation Bureau

Delay and congestion in traffic, even though they do not produce accidents at the point of congestion, may cause accidents elsewhere. Rushing to make up lost time, lack of patience, mental irritation, induce reckless and careless driving with all its hazards. As an ex-

ample, in San Antonio, Texas,* correction of a bottleneck near an intersection reduced accidents 71 per cent within a one-block radius.

Many driver violations in accidents involve the parking of vehicles. In Seattle, Washington, about 3 per cent of all driver violations in accidents are in connection with parking.

Influence of Angle and Parallel Parking on Accidents

Angle and parallel parking usually produce different accident rates. In most instances, accidents are more numerous in angle parking than in parallel. The indirect influences of angle parking on accidents is greater than that of parallel parking. In angle parking, drivers leaving parking places are inclined to move their vehicles blindly into the traffic stream, thereby forcing moving cars to swerve, inducing collisions with vehicles in other lanes. More congestion is created, thus breeding accidents.

To avoid collisions with cars parked at an angle, drivers tend to "steer clear" of the rear of such vehicles, often clearing them by as much as 5 or 6 feet. Some will drive with their left wheels over the center-line to clear parked cars.

Another hazard created by angle parking is that of drivers making U-turns across on-coming traffic to enter curb spaces on the opposite side of the roadway.

Coupled with the obstacle, that is, to moving traffic, the hazards of angle parking place it at a decided disadvantage as a type of curb storage.

Angle parking can defeat the advantages of modern traffic control devices. Such a case was cited in a progressive town. A fully-actuated traffic signal layout was recommended by traffic engineers, and installed. It was designed with the understanding that parallel parking would be substituted for diagonal parking on the approaches to signalized intersections. Strong objections arose from merchants on the basis that the curb capacity was reduced and that women operators find parallel parking difficult. As a result, diagonal parking was reverted to and the signal system failed during peak hours.

* Information furnished through American Transit Association by Mr. H. A. Briggs, Safety Director, San Antonio Transit Company.

As a further result, signals were put on flashing operation, an expensive and efficient signal system was sacrificed, safety along with it, for the selfish interest of a few.

Eliminating all-day and long-time parking, parallel parking will often accommodate parking demands except during peak periods, when neither angle nor parallel parking meets full needs.

A survey on a business street in Chicago[20] revealed a 63 per cent reduction in accidents when angle parking was changed to parallel.

A study[21] in another city indicates that more accidents occurred with angle than with parallel parking. Two street sections of the same length and almost identical widths have solid business frontages. Each street has an average daily traffic of 8,000 vehicles. With other types of accidents, about the same for the two sections, parking collisions are almost three times greater on the street with angle parking than on the street with parallel parking. Results are shown by years in Table I.

Oakland, California furnishes another significant example.[22] Two parallel streets for six blocks in the central business district have the same widths between curbs. One with parallel parking carries approximately 4,100 vehicles, including buses, during the 12 hours. The other has angle parking and carries only 3,000 vehicles with no buses. Accidents involving parked cars numbered 46 on the street with angle parking as compared with only 23 on the street with parallel parking, during the same period. Collisions at intersections were more numerous on the street with angle parking: 183 to 82, attributed largely to impaired vision at intersections with angle parking.

In Miami Beach, Florida[23] in 1938, cars were parked diagonally on Washington Avenue, an 80 foot street. Thirty-six per cent of the city's accidents and 65 per cent of the transit accidents occurred on this street. Delays were numerous and for long periods. In 1939

[20] "A Plan to Relieve Traffic Congestion in the Ashland-47th Shopping Center," July 1939. Chicago Motor Club, City of Chicago and Chicago Surface Lines.

[21] Data furnished by Mr. F. Bruce Crandall, Traffic Engineer, Oregon State Highway Commission.

[22] Facts furnished by Mr. J. A. Czizek, Traffic Engineer, Oakland, California, accident data from 1940 to 1946 and do not include pedestrian accidents.

[23] Data furnished by Captain John Hoover, Traffic Inspr., Miami Beach Police Department.

angle parking was changed to parallel and speeds were controlled by a flexible progressive signal system. A check after one year showed only 3 per cent of the city's accidents and 1 per cent of the transit

Table I

ANGLE PARKING VS. PARALLEL PARKING
A STUDY WITH REPRESENTATIVE CONDITIONS
SALEM, OREGON, 1941–45*

TYPE OF COLLISION

	Rear-end		*Sideswipe*		*Parking*		*Pedestrian*		*Misc.*		*Total*	
Year	*Ang.*	*Par.*	*Ang.*	*Par.*	*Ang.*	*Par.*	*Ang.*	*Par.*	*Ang.*	*Par.*	*Ang.*	*Par.*
1941	2	4	1	4	23	9	1	1	3		30	18
1942					11	5	1	1	1	1	13	7
1943	1	1		2	6				2		9	3
1944	1		1		6	3			1		9	3
1945	1		2	2	11	3	1		1		16	5
Total	5	5	4	8	57	20	3	2	8	1	77	36

SEVERITY

	Non-Fatal		*Prop. Damage*	
Year	*Ang.*	*Par.*	*Ang.*	*Par.*
1941	1	1	29	17
1942	1	1	12	6
1943			9	3
1944			9	3
1945	1		15	5
Total	3	2	74	34

* Data furnished by Mr. F. Bruce Crandall, Traffic Engineer, Oregon State Highway Commission.

accidents on this street. Results were so satisfactory that all diagonal parking is now being eliminated in the city.

Kansas City, Missouri is another interesting case.[14] Accidents were reported for streets on which angle parking was changed to parallel in 1938, and was changed back to angle 18 months later. With angle parking, there was an average of five accidents per block

[14] Facts submitted by Mr. T. J. Seburn, Traffic Engr., Department of Public Works, Kansas City, Missouri.

per year involving parking; with parallel parking, one accident per block per year.

A main street in a Minnesota town of 10,000 population had a bad traffic condition.[35] Signals were requested. Parking was changed from angle to parallel. Accidents were reduced and traffic flow became so orderly that the request for signals was withdrawn. Six months before the change, 27 accidents were reported which involved parking or unparking. During the six months following the change which included heavier traffic volumes, there were only 16 accidents—a 41 per cent reduction.

Though accident statistics on curb parking may not convince officials that angle should be changed to parallel, such statistics often prevent changing parallel to angle. Such a situation developed recently in Macon, Georgia.[36] A study on a downtown street in 1945 showed that 57 of 182 accidents occurred on an especially congested 1200 foot section. Angle parking was the cause, or major contributing factor, in 76 per cent of these 57 accidents.

On two of six blocks of another important street in Macon, angle parking is used. Of 68 accidents in these six blocks in 1945, thirty occurred on the two blocks with angle parking. Half of the 30 accidents were due to the type of parking employed. With these examples, efforts to abolish parallel parking on other streets were defeated.

Double-Parking Induces Accidents

In many city areas, sufficient loading and unloading zones are not provided at the curb or off-street, for commercial vehicles. In others, those facilities provided are not well used because of lax enforcement. As a result, many collisions involve, or are caused by, vehicles double parked, stopped in the roadway, or parked at the curb where parking is prohibited.

A study made by a transit company[37] revealed that double-parked vehicles either directly or indirectly contributed to 17 per cent of bus

[35] Facts from Mr. J. E. P. Darrell, Asst. Traffic Engineer, Minn. Department of Highways.

[36] Information furnished through American Transit Association by John Gerson, Manager, Transportation, Georgia Power Company.

[37] From study of San Antonio Transit Company by Mr. H. A. Briggs, Safety Engineer. Furnished through American Transit Association.

accidents in congested areas. These double parking collisions represent 4 per cent of the company's total for the city.

When double parking is allowed to go unregulated, serious conditions always develop. A case was furnished in which double parking was tolerated to such an extent that few drivers pulled to the curb, fearing entrapment by double parkers. Another case in a small town indicated this condition had gotten so far out of hand that highway department officials were requested to erect "No triple parking" signs along main streets. Parking had moved completely away from the curb. These conditions illustrate dangers arising from parking enforcement at its worst.

Stalled and Stopped Vehicles

Because of mechanical failures or for other reasons, many vehicles stall or must be stopped in the traveled portion of the roadway; often the stop is of an emergency character. A number of collisions take place with these vehicles and driver actions aimed at averting collisions often result in other types of accidents. These conditions are usually at their worst in rural areas where speeds are higher and transverse maneuvering areas are restricted. Short sight distances and a lack of appreciation or concern on the part of the driver for his own and others' safety add to the seriousness and frequency of this common type of accident.

Collisions with vehicles stalled or stopped in the roadway are apt to be more numerous and more severe during hours of darkness. Frequently vehicles are not properly lighted and no advance warning is given.

In 1945, about two-thirds of the deaths involving interstate commerce vehicles resulted from such vehicles stopped in, or along, the roadway,[18] because of mechanical defects. One-fourth of all mechanical defect accidents were due to collisions in which one of the vehicles was disabled. Two and seven-tenths per cent of all interstate motor carrier accidents involved mechanically faulty vehicles stopped on the roadway.

[18] "Analysis of Mechanical Defect Accidents of Motor Carriers—1945," U. S. Interstate Commerce Commission, August 1946, p. 4.

Runaway Vehicles

A surprising number of accidents involve vehicles which break loose from parking places on grades. Brake failures and carelessness are usually the causes. Such accidents result in severe damage to the "runaway" vehicle and are great danger to other vehicles, persons and property.

A 1945 Interstate Commerce Commission study of mechanical defect accidents of motor carriers shows that 24 of 31 accidents involving parking were due to brake failures. Some occurred while the vehicles were parked on grades, others when engines failed going up-hill. In both cases, "runaway" conditions were created.

Unattended cars left with motors running have been known to create "runaway" problems. When cars are parked with motors running, another hazard develops from the likelihood of carbon monoxide poisoning. Insurance companies report accidents resulting from persons becoming affected by carbon monoxide under these conditions, who, failing to realize their "groggy" condition, became involved in collisions upon putting their cars in motion.

Parking Violations and Inadequate Control Cause Accidents

Double parking, parking on the wrong side of the street, parking too close to corners, parking in prohibited zones, parking too far from curb, parking improperly as to space layout, and other such violations add to the hazards created by parked cars. One case is known of a city which legalized double parking on downtown streets —and soon regretted it!

In 1945, in Seattle, Washington, 7.15 per cent of the vision obscurements causing accidents were created by parked cars.[28]

Irregular parking at the curb and on an 84 foot median strip on a highway in Michigan[29] created a serious accident problem. Strict regulation aided by erection of a fence around the median strip to control exits and entrances, brought an 87 per cent reduction in accidents involving parked cars.

[28] Example from Mr. Arch Bollong, Traffic Engineer, Seattle, Washington.

[29] "Getting Results," No. 3, National Conservation Bureau, Data submitted by Mr. J. L. Wehmeyer, Traffic Engineer, Wayne County, Michigan.

Pedestrian Accidents Affected by Parking

Many pedestrians, entering the roadway from behind parked cars, are struck by motor vehicles. While these unfortunate accidents may not be entirely the fault of parking, it is apparent that if there were no parking there would be no visual obstruction to create this danger. A recent study in Seattle, Washington revealed that about 7 per cent of the pedestrian accidents were affected by parked cars. Most correctives will likely come from control of both pedestrians and parked vehicles. The question of improving the visibility between motorists and pedestrians is sufficient cause to justify further restrictions on the use of curb for parking.

Persons getting out of parked cars and cabs on the street side is another cause of pedestrian casualties. In some cities this practice is legally prohibited.

Transit Vehicles in Parking Accidents

Buses and street cars, because of their size and necessary operating conditions, are often involved in collisions with stopped vehicles or with those parking or unparking. Transit vehicles are often delayed by improper parking and stopping practices. Running times of buses and street cars have been greatly reduced by changing from angle to parallel parking, by prohibiting parking during rush hours, and by other parking measures.

The effect on transit accidents of prohibiting curb parking in downtown districts is shown in Table II. As motorists, truckers and transit vehicle operators became accustomed to the new regulations, large reductions in accidents followed.

Parking in bus stops, particularly during peak hours, is especially hazardous because of the congestion developed and because of exposures to traffic of persons using buses.

Where buses operate on roadways without curbs, hazards involving stops could be eliminated by the provision of improved turn-outs and strict enforcement of their use. Unfortunately, this is not common practice.

During the first eight months of 1946, ten per cent of all street

car accidents and 18.9 per cent of all bus accidents in New Orleans[31] involved parked cars.

"Squeezing in" another parking space near the intersection, especially where meters are used, creates traffic accidents. A case from San Antonio, Texas[32] is typical. Buses making a right turn were involved in 5 accidents in a four-months period at an intersection in

Table II

TRANSIT COLLISION AND PASSENGER ACCIDENTS WITHIN THE PHILADELPHIA CENTRAL BUSINESS DISTRICT[33]

Date	*Accidents*	*Per Cent Decline*
PRIOR TO PARKING BAN:		
Weekly Average: 11/28/45—12/25/45	51	–
AFTER PARKING BAN:		
Week ending January 8, 1946	38	7
January 15, 1946	39	5
January 22, 1946	34	17
January 29, 1946	33	19
February 5, 1946	26	37

the business district. Delay and congestion were developed by buses in negotiating the turn. One parking space was eliminated at the intersection and no accidents of the above type have occurred in two years.

Prohibition of parking opposite street car loading zones and on the approaches to these zones reduces accidents. The sign on the end of a loading zone in the District of Columbia[34] was knocked down 22 times in a thirteen month period. The throat on the right side of the platform was opened by removing three parking spaces preceding the approach to the zone. Accidents were all but eliminated. In nine months, only one was reported.

During an approximate two-year period, two street car lines

[31] Furnished through the American Transit Assoc., by Mr. J. C. Baine, Jr., General Superintendent, R. R. Dept., New Orleans Public Service Co., Inc.

[32] Furnished through American Transit Assoc., by Mr. H. A. Briggs, Safety Dir., San Antonio Transit Co.

[33] "Parking Ban Improves Mid-City Service." OFF-PEAK—Philadelphia Transit Company, March 1946, p. 4.

[34] Information from Insp. A. E. Miller, Metropolitan Police Dept., Washington, D. C.

operating over narrow streets in the business section of New Orleans[26] had 708 accidents. Five hundred, 71 per cent, occurred on a section of the line which represents only 25 per cent of the round-trip circuit. Of these 500 accidents, 30 per cent were collisions with illegally parked cars.

Prohibition of Parking Often Necessary

Where traffic densities are heavy, congestion and accidents may be greatly reduced by prohibiting parking at the curb and by rigidly controlling loading and unloading operations. Results of such actions are shown by many experiences. Due to one-way streets with center car tracks and left-side parking, congestion was great and accidents were numerous in mid-town Philadelphia[27] in 1946. By a general prohibition of parking, by permitting loading and unloading only on the right side, and by allowing loading of heavy materials on the left side only with special permits, average speeds were practically doubled and accidents were reduced 15 per cent to 20 per cent in the affected area. During this same period, city-wide accidents increased 45 per cent.

On a street in Washington, D. C.[27] parking at the curb was prohibited for a distance of about 2 miles. The street is 42 feet wide, with a double street car track. After a year, with the same volume of traffic, there was a 27 per cent reduction in accidents.

Buses operating on a two-block section of a narrow street in New Orleans, were involved in 27 collisions with parked vehicles in seven months. Parking was eliminated on one side of the street in one block and only commercial loading was allowed on the same side of the other block. After more than a year, no collisions were reported on the first block and only four occurred on the other block.

When parking is prohibited, care is necessary to see that stopping and standing are also prohibited. One truck parked on a street creates a bottleneck and reduces the efficiency of the street. Many side-swipe

[26] Data obtained through the American Transit Assoc., from Mr. J. C. Baine, Jr., General Supt., St. R. R. Dept., New Orleans Public Service, Inc.

[27] "Getting Results," No. 76, National Conservation Bureau. Example submitted by Mr. R. A. Mitchell, Chief, Bureau of Traffic Engineering, Philadelphia, Pa. Information also furnished by Philadelphia Transportation Co., through the American Transit Assn.

[27] Information furnished by Insp. A. E. Miller, Metropolitan Police Department, Washington, D. C.

Courtesy of Dallas Times Herald

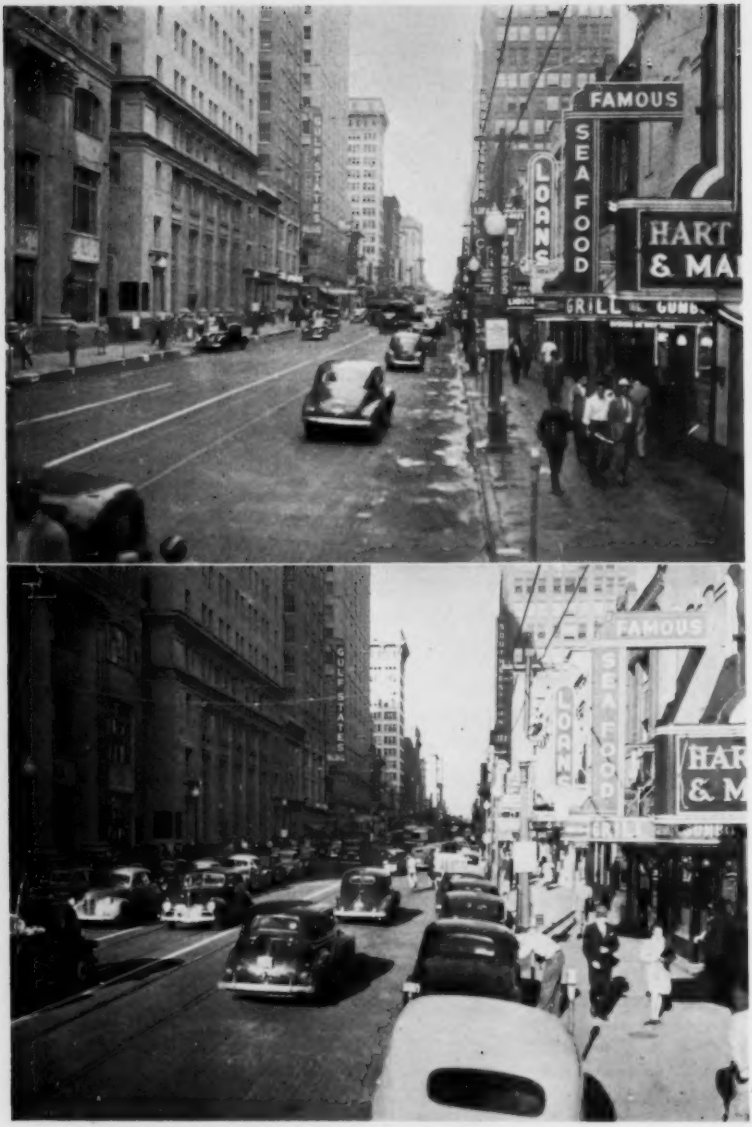


FIGURE 1. Effect of parking prohibition on rush hour traffic, Dallas, Texas

accidents are caused by cars pulling out and around parked trucks. Any stopping or standing, even momentarily, seriously impedes the flow of traffic on heavily traveled streets. Streets on which parking is not allowed in Washington, D. C., have had their capacity increased 15 per cent by adding "No Stopping" regulations during rush hours.

A reservoir for vehicles on the approach to a signalized intersection can be created by prohibiting parking for a distance of 50 feet to 150 feet from the intersection. Such action results in efficient intersection performance and signal operation. When street widths change at intersections, parking prohibition on the narrow street reduces the bottleneck effect and eliminates collisions.

Prohibiting parking during rush hours is becoming a common practice to alleviate congestion and reduce accidents. On an important artery in Washington, D. C.,[a] 60 feet wide, occupied by a heavily used street car line, parking was prohibited on one side from 7:00 to 9:30 A.M. accommodating the home to office rush, and on the other side from 4:00 to 6:00 P.M. A check-back after three months revealed a 70 per cent reduction in accidents, with a marked increase in speed and traffic volume.

Prohibitions of parking in the congested area of Dallas, Texas, during the afternoon from 4:30 to 6:00 P.M. reduced accidents and delays[b] and increased average speeds 27 per cent. A "before" and "after" check of accidents for three months showed 15 accidents (6 property damage) before the change and 11 accidents (all property damage) after the change; a 21.6 per cent reduction in all accidents and elimination of personal injury accidents. Figure 1 shows the general improvement effected by prohibiting parking during the rush hours.

By prohibiting parking during peak hours of the afternoon—4:30 to 6:00 P.M.—accidents were practically eliminated over a four-block area in New Haven.[c] "Before" and "after" studies reveal an 88 per cent reduction in all accidents with parking at the curb pro-

[a] Information furnished by Capital Transit Co., through American Transit Assn.

[b] From information supplied by Mr. W. C. Brandes, Traffic Engineer, Department of Traffic Control, Dallas, Texas.

[c] Data procured from Mr. H. P. Clark, Chief of Police, Department of Public Service, New Haven, Conn.

hibited. The same measures on two blocks of another street show the same excellent results.

Eliminating parking in congested areas need not seriously affect business; however, complete elimination of parking without comparable off-street facilities can reduce the use of streets. An analysis of the curb capacity available to each business establishment on most business streets, will reveal that business houses would seldom average more than one full parking space per place of business.

Conditions on a congested business street in St. Paul[8] were greatly improved by eliminating parking, resurfacing, installing new curbs and sidewalks, and eliminating all trolley poles, ornamental lights and advertising signs which extended more than 12 inches from store fronts. Deliveries are limited to the period 9:00 to 11:00 A.M. The street has been "opened up" without widening, traffic is greatly expedited, accidents are reduced, and business has been increased from 20 to 40 per cent.

Influence of Road Design on Parking Accidents

There are many phases of design in both rural and urban roadways which have a direct bearing on parked car accidents. Curb heights, sudden transitions in street widths and inadequate widths to accommodate both moving traffic and parking are perhaps the most common design factors contributing to parking accidents on city streets. In the first case, vehicles cannot be properly parked and occupants cannot properly leave them because of the interference of high curbs with the opening of doors. Lack of adequate curbs may encourage improper placing of parked vehicles so as to obstruct sidewalks. Bottlenecks and inadequate widths of traffic lanes necessitate changes in space arrangements, expensive widening, and rigid regulations which are often difficult to enforce.

Widened streets and special curb cut-backs may allow parking and remove interference with moving traffic. In some cities, land owners have consented to bear the expense of such measures rather than risk the enactment of parking prohibitions. Control of the design, construction and use of such special curb cut-backs is essen-

[8] Facts obtained from Mr. J. E. P. Darrell, Asst. Traffic Engr., Minn. Dept. of Hwys.

tial. Minimum depths of 18 feet or 20 feet, pavement markers requiring parking at not greater than 45 degrees to the line of the roadway, and adequate sight distances at intersections are among the needs suggested.

Rural and suburban areas present a number of additional design factors which bear directly on parking hazards. Inadequate shoulders make it difficult or impossible for vehicles to park off the travel portion of the roadway. Some of the newest highways fail to provide sufficient shoulders for parking.

The removal of vehicles from the traveled surface is made difficult by the construction of curbs along rural highways.

Bus turn-outs created by widening and surfacing shoulders on rural and suburban roads have reduced accidents in many localities. The danger of collision with school buses is alleviated by providing adequate space on the shoulders for bus stops.

The lack of provisions for parking and emergency storage spaces on long fills and on the approaches to bridges on rural roads create additional accident hazards involving parked or stalled cars.

Failure to provide adequate turn-outs and parking areas at points of scenic interest, and elsewhere where stops are commonly made by motorists, creates parking hazards and increases accidents.

Some four-lane undivided roadways are constructed without providing sufficient pavement width for parking. Even an occasional parked car during peak periods reduces the travelway by one lane. Unless sufficient width is provided for curb parking, the effective street width is reduced and congestion and hazards are created, again bringing the parking problem squarely into road design. This whole question is closely related to the problem of the slow moving vehicle on high speed, heavily traveled roads.

Relation of Access Control to Parking

Along many roadways through suburban areas, access control is a difficult problem. Where uncontrolled entrances and exits are permitted, many accidents invariably occur. A common scene of accidents is at the roadside stand which generates traffic and frequently, because of its nature, creates careless and reckless attitudes.

The influence of parking on traffic accidents has not been sufficiently considered in studies on congestion and insufficient storage space and their relation to accident causes. Most motorists are daily confronted with the latter elements of the parking problem while parking accidents affect only those directly involved. Accidents and hazards related to parking, however, should be considered in all studies of parking. Data pertaining to them are valuable in determining correctives and can be a major factor in having changes adopted. Several suggestions have been made, and examples shown, of utilization of accident facts in dealing with curb parking problems.

As with other traffic situations, problems developed by curb parking are often difficult to solve. Often the needs and answers are known, but local conditions and opinions prevent their application or adoption. Each parking situation must be considered separately and its peculiar conditions analyzed. However, there are certain common factors which are found in practically all parking problems. Some of the common elements which need to be considered in developing and putting correctives for curb parking hazards into effect may be summarized as follows:

1. Traffic surveys of which accident studies should be a part.
2. Proper regulations.
3. Strict, continuous and impartial enforcement.
4. Official and business cooperation.
5. Control of moving traffic and pedestrians.
6. Off-street parking facilities to supplement curb spaces.

Getting Support for Traffic Safety Education in the Community

WILLIAM M. GREENE

William M. Greene has been Director of the Highway Safety Commission of the State of Connecticut since 1944. For twelve years before that he was Director of the Traffic Safety and Research Section of the Connecticut Department of Motor Vehicles.

IN DISCUSSING community organization for accident prevention it is assumed, of course, that a state agency exists charged with the responsibility for coordinating such effort. That is the only effective way to organize the state program. If no such specific agency exists it is practically useless to discuss organization of communities.

Over the years, the establishment of such an agency, or the designation of an already established state agency to coordinate the State Safety Program, has been discussed so intensively that it would be redundant to discuss it here.

Suffice to say that any state not so organized can never organize communities effectively. Obviously inspiration for statewide action must come from the state level, not from the municipal level, except as concerns individual communities so imbued with progressive ideas that local organization is effected on their own initiative without waiting for solicitation.

Now my comments must necessarily be based on experience in Connecticut.

There are 169 townships in the State. There is a local Traffic Safety Committee in each of those 169 towns, varying in numerical personnel according to local needs.

These 169 community safety committees represent, approximately, 1200 representative Connecticut citizens willing to contribute a reasonable amount of time and effort at selected periods during the year to support the state safety program.

This continuing interest in accident prevention is the main reason for Connecticut's consistent success, year after year, in ameliorating vital phases of traffic accident experience.

Outstanding in the framework of any state safety program is education, both formal in the schools and the informal type essential outside classrooms. Therefore, in establishing the community safety committee the organizer working on the state level is creating an effective channel to develop traffic safety education in the community, as well as activation of other phases of a well-rounded traffic accident prevention program.

It has been well said many times over past years that the main purpose of the safety movement is safeguarding the individual from accidental death or injury. The individual, of course, is regarded not only as the object of the effort but also as the principal instrument of his own salvation.

Traffic controls have been developed through engineering studies. Traffic patrols have been developed through enforcement experience. But these regulatory and supervisional measures are not sufficient in themselves to accomplish the full purpose of the Traffic Safety Program unless the individuals designed to be protected are in sympathy with such employment.

Such acceptance by the individual can be obtained through developing proper attitudes as motor vehicle operator and pedestrian, everybody—practically—being one or the other, and many adults being both.

Traffic controls and traffic supervision have limitations. This is also true of the theoretical establishment of accident-free public ways through advanced engineering science.

It seems reasonable to assume that safe use of streets and highways depends more upon the skilled movement of the vehicle and pedestrian than upon established signs, pavement markings, police supervision or any other type of supervisory or regulatory action. It is upon the individual himself that dependence must be placed for the prevention of accidental death or injury from hazards to which traffic flow is exposed on any thoroughfare open for public use.

Of paramount importance, therefore, is safety education. By this is meant development of a proper mental attitude towards accidents; the conception that accident prevention is both desirable and practical; determination to undertake it; an adequate knowledge of how accidents are caused, and finally, acquisition of specific skills and

habits essential to safety in whatever activity one may attempt, particularly in operation of motor vehicles on today's traffic-packed arteries—public ways which will be even more hazardous during 1947 than in any year so far recorded, for reasons well known to all conversant with traffic problems.

Safety education is the keystone of the arch of traffic accident prevention, vital today, more than ever, for those who would enjoy the increasing longevity which medical science has developed.

It is not my assignment to discuss techniques of safety education; whether it should be attempted on a mass basis or major effort applied to those deemed accident-prone. It seems essential that educational effort should start from the kindergarten and be integrated throughout scholastic years.

As experience indicates proneness to accident involvement, extra specific effort should be applied to such individuals. Certainly motor vehicle administrators have opportunity to contribute to this phase of safety education through weighing the driving experience of licensed operators and checking them constantly for accident and violation involvement, since the latter leads to the former when not actually the initial cause.

There is little I can say about the need for community organization that has not already been well expressed. Several years ago the National Safety Council issued a pamphlet entitled "Educating the Public for Traffic Safety."

Therein is stated: "The extent to which a state or community is willing to go in attempting to improve its traffic accident record depends upon the degree to which its citizens have been educated to the need for accident prevention. If a proper attitude has been developed the public will be completely impressed with the practicability, importance and necessity of an effective program embracing education, enforcement and engineering."

Connecticut started ten years ago to organize community traffic safety committees. A simple procedure was adopted. Initial steps included a survey of the community's apparent needs to develop a reasonable picture of the traffic situation in the particular city or town.

Probably the best source of information regarding facts about

a community can be gained from the newspaper editor. He can point out potential pitfalls. It is important to get away to a good start and not offend by indiscreet action. With a definite plan in mind an interview with the chief executive of the city, the mayor, or the first selectman of a town, is the next step.

Experience proves that the best way to insure a good start is to work with and through the chief of the police department. He is the official with whom cordial relations must be established else little success will be gained in organizing any particular community. There need be little trouble in winning the police chief to favor an organization plan. Properly approached, he will appreciate that such a committee can be of practical aid to him in many ways.

After placing the specific plan before the community's chief executive, outlining what has been accomplished in other communities through effective local organization and getting the police chief's endorsement, the idea will invariably be accepted, possibly with some modifications but essentially as set up.

Outstanding among recommendations, of course, must be the personnel of the committee. It should include the police chief, the superintendent of schools, the city or traffic engineer, a representative of the Chamber of Commerce or similar civic organization, and also one or more persons representing the motorist. It must include women as well as men. The committee personnel should represent accepted leaders in the community, men and women whose personal influence are invaluable assets and who can give a reasonable amount of time and effort to the committee's activities.

We have always found the chief executive of any community willing to accept suggestions as to committee personnel. Ideas as to who would be ideal members can be gained by discreet contacts before broaching the subject officially. The group, of course, is nonpartisan.

If the committee personnel has been chosen wisely, an ideal channel is established to secure progressive action along all three accepted lines of Education, Enforcement and Engineering. You have men and women able to go before the Board of Education and argue for more and better safety education courses in all grades and facilities in teaching personnel and materials.

The superintendent of schools, through membership on the committee, will be impressed with the need for more and better safety education—if he had any doubts previously—so that the task of steadily advancing the cause of safety education in the schools is not difficult.

Through the community committee, access is obtained to newspapers and radio stations so that, through the printed and spoken word, driving and walking hazards can be effectively presented to the community as a whole, supplementing formal school courses and reaching those beyond school age.

Through the committee it is practicable to secure funds for membership in the National Safety Council, to purchase materials essential to efficient conduct of special promotions, and those on the state level have a constant contact available to upgrade the state program as a whole.

Sixteen years ago the National Conference on Street and Highway Safety had this to say:

"Traffic is a matter of state and local control. Its regulation has developed diversely in various jurisdictions. Such diversity is not necessary, however, as there are large groups of states and localities in which the essential characteristics do not vary materially.

"The elimination of the existing diversity in traffic administration and control, as well as the inculcation of safe driving practices, establishment of adequate traffic facilities *and education of the public in regard to these matters* are susceptible of a large degree of standardization throughout the country.

"To attain these ends, without further centralization of authority in the Federal Government, requires a high degree of cooperation and acceptance of a common program by the States, the local authorities, associations and individuals throughout the country."

Connecticut has long subscribed to the validity of this principle. Over the years the main objective has been to impress upon all communities, whether a large incorporated municipality or a small town, that the state safety program is only the consolidation of individual community efforts.

The Connecticut idea has been to place responsibility for local

traffic accident prevention effort squarely upon the local officials and citizenry and, when amelioration of accident experience has been gained, to give credit freely to the community's officials and citizenry.

It is essential, of course, and to be expected that effort to upgrade traffic safety education in the communities will have the cordial, hearty support of the State Department of Education. It is unthinkable that it would be otherwise.

There is nothing new about the idea of organization by communities. In politics the goal is to organize by precincts; in business the objective is to organize by sales districts. To get essential coverage one must have intensive organization and for the state safety program that means organization by communities, large or small.

The responsibility resting on the state agency, after organizing the community group, is to keep the committee functioning. A natural mortality in loss of members is to be expected. Personal contacts are essential through the year; bulletins and other material must flow to the community committee personnel to advise and guide them.

Safety can be sold the same as any other idea has been sold over the years, if the right amount of skilled, earnest and continuing effort is put into taking the case to the people. It is not enough to issue somber preachments. There is a selling job to be done and we should all be about it, constantly.

Recently I ran across the following: "It is unthinkable that our people will permit present conditions to continue indefinitely. The way for improvement has been pioneered. Practically every one of the proposals now submitted has been tested in practice.

"To reap the benefit of this experience on a nation-wide scale will require some yielding of state and local preferences; it will require devotion of increased resources which no state or community can afford to withhold; it will, in many jurisdictions, require the setting up of more adequate administrations; it will require the loyal effort of enforcing authorities; it calls for devoted efforts of a wide variety of organizations concerned with the various phases of the problem; and, finally, it demands of the individual citizen a new order of self-

restraint and sense of responsibility corresponding to the enhanced degree of freedom which the new means of transportation has given us."

Does not that comprehensive statement apply today? It could well have served as a summation for the Action Program developed last May in Washington.

Yet it was written sixteen years ago, as the concluding paragraph of the recommendations developed at the Third National Conference on Street and Highway Safety, likewise held in Washington and during the month of May, 1930.

After reading monthly statements of the National Safety Council regarding increased traffic accident experience around the country it would be easy to infer that whatever the expended effort since 1930, it has not been sufficient to master the developed hazards.

Somehow or other action prevention agencies have not, as yet, apparently accomplished the vital task of convincing the public as a whole that traffic safety is an individual responsibility; that time saved in reaching a destination, whether it be miles distant for the driver or merely across the street for the pedestrian, is not worth chances taken in accomplishing the trip hazardously.

Years ago the Aetna Life Insurance Company popularized this saying: "Stop Saving Seconds, Save Lives Instead." Through persistent educational effort in all school grades and in all walks of life we must sell that thought. Through organized community effort it is possible to interest the individual citizen so that he sees himself as the essential factor in the whole safety plan.

The old advertising slogan, "Keeping Everlastingly At It Brings Success," applies to accident prevention effort. We should exemplify it every day in the year in our various capacities.

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